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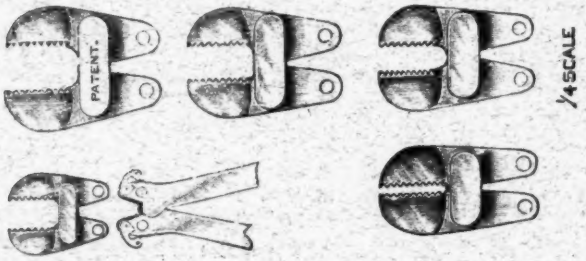

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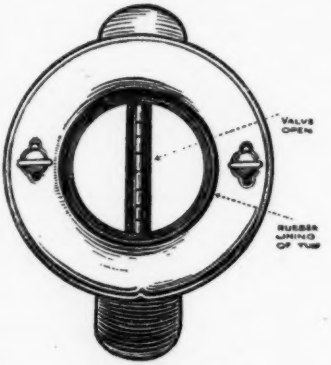

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THE

VETERINARY JOURNAL

OCTOBER, 1911.

PROFESSOR W. OWEN WILLIAMS.

We deeply regret to have to record the death, which took place suddenly on Thursday, the 7th ult., of Professor Owen Williams, at the comparatively early age of 51 years. Professor Williams had been suffering from varying degrees of ill-health over a somewhat prolonged period.

William Owen Williams, F.R.C.V.S., F.R.S.E., was a Yorkshireman by birth, having been born in Bradford in 1860. He was quite a young lad when his late father removed from Bradford to Edinburgh to take over the principalship of the Royal (Dick) Veterinary College. After receiving his early education at the Edinburgh Royal High School and Edinburgh University, he entered as a student the New Veterinary College, which was founded by his late father in 1873, qualifying from that institution on April 20, 1881, fully six months before he had attained his majority. He then went to Alfort and studied under Professors Goubaux, Nocard and Trasbot, and in 1879 and 1880 was a pupil with Messrs. Stephenson and Elphick, Newcastle. On his return from Alfort he became assistant to his father, and a few years later Lecturer on Morbid Anatomy, Cattle Pathology and Canine Medicine at the New Veterinary College, Edinburgh. On April 29, 1886, he obtained his Fellowship Diploma of the Royal College of Veterinary Surgeons, and in March, 1897, was elected a Fellow of the Royal Society, Edinburgh. Since 1894 (when first elected) he had been a Member of the Council of the Royal College of Veterinary Surgeons, of which body he was elected President in

1902, being re-elected the following year. During his first term of office in 1901-2, owing greatly to his exertions, the then Secretary of State for War was persuaded to appoint a Committee to inquire into the condition of the Army Veterinary Department, and he was nominated a member of that Committee, travelling from Edinburgh at great inconvenience to himself to attend meetings in London; and during his second year of office as President of the Royal College of Veterinary Surgeons a new warrant for the Army Veterinary Department was brought out. That day was a red-letter one in the life of Professor Williams; he had fought long and well on behalf, not only of the Army Veterinary Corps, but of the profession as a whole.

In January, 1900, at the special request of the War Office, he proceeded to New Orleans to act as veterinary adviser regarding the shipment of horses to South Africa during the Boer War, and as a result of the measures adopted on his advice the average landed in South Africa alive and well was over 97 per cent. Unfortunately he contracted malaria and rheumatism in the unhealthy climate of New Orleans, and had to return to England in such a serious state of health that for some time his life was despaired of.

For a number of years Professor Williams was veterinary officer to the Lowthian and Berwickshire Yeomanry Cavalry, and was also Honorary Veterinary Surgeon to His late Majesty the King as well as to his present Majesty.

He was the author of numerous publications on veterinary medicine, and was for several years editor of the VETERINARY JOURNAL, which position, however, he was compelled to resign owing to pressure of business connected with the removal of the New Veterinary College from Edinburgh to Liverpool.

In spite of many difficulties and obstacles the School was incorporated with the Liverpool University and formally opened on December 13, 1904, by the Right Hon. Walter Long, M.P., then President of the Local Government Board.

Professor Williams married in 1885 Annie Christine, daughter of Mr. John Flint, of Glasgow, by whom he had two sons and a daughter.

Apart from scholastic attainments of a high order and a wide and varied experience of men and affairs, which earned for him a career as brilliant as it was popular in his chosen profession,

the late Professor Williams possessed personal qualities, both intellectual and temperamental, that secured him the friendship of a large circle of friends and acquaintances in various walks of life.

Editorial.

"ANTHRAXIN" AND "ANTHRAXINE."

We publish a letter on page 605 from the Pasteur Vaccine Company, referring to an article in our last issue. The statements in the article were obviously the opinion of Dr. Dawson and based on experiments carried out by him. He explained the method by which his "Anthraxin" was prepared, and there can thus be no doubt as to the substance to which he referred. Obviously we cannot hold ourselves responsible for experiments recorded in our pages, nor for the conclusions based on them. They are recorded as a matter of general information for the benefit of the veterinary profession as a whole and as a part of our policy of giving all sides of a question as it is presented to us.

We are ignorant of the method of preparation of the Pasteur Vaccine Company's "Anthraxine," but it would appear that it is an entirely different preparation from Dr. Dawson's "Anthraxin." Consequently we trust that the publication of Dr. Dawson's results and opinion of the use of "Anthraxin" will in no way interfere with the employment of "Anthraxine," and we trust the latter will afford in general practice the excellent results claimed for it by the Pasteur Vaccine Company. The convenient way in which it is put up in cord form is certainly a very great advantage from many points of view, compared with the liquid preparations.

General Articles.

SOME MEMBERS OF THE ROYAL COLLEGE OF VETERINARY SURGEONS WHO HAVE ACHIEVED NATIONAL DISTINCTION IN COMPARATIVE MEDICINE IN THE UNITED STATES OF AMERICA.

By Dr. ARTHUR HUGHES, Litt.M., Ph.D. (Cornell University), D.V.M. (New York State Veterinary College),

Inspector of Food Supplies, Subsistence Department, United States Army, Chicago; Professor of Dairy Inspection and Milk Hygiene, and sometime Lecturer on Meat Hygiene, Chicago Veterinary College, &c., &c.

The Royal Veterinary College, London, proudly bears the title of "parent of veterinary schools in English-speaking countries." It is just one hundred and twenty years ago since Charles Vial de Saint Bel, the Equerry of Louis XVI of France, then the Principal of the Lyons Academy and Demonstrator of Comparative Anatomy at Montpelier, who, when a refugee from the French Revolution, was chiefly instrumental in founding the first English veterinary school. The torch of veterinary intelligence was carried from France to London, then from London to other points in Great Britain and Ireland, accompanied by the upspringing of new schools. England is indebted to France for the foundation in London of a school whose destiny was to foster many great minds and to be the parent of other veterinary schools, at home and beyond the seas. Nor should it be forgotten that this year of grace, 1911, is the 200th anniversary of the foundation of the Lyons School by Bourgelat. The link is a solid one from Bourgelat to Saint Bel, and from Saint Bel to us at present. The stream of veterinary intelligence has run freely from France to Britain, and from Britain to America.

It is fitting, therefore, at this time, to recognize the services of what is, on last analysis, the Royal College of Veterinary Surgeons, to veterinary learning in the United States of America. Though it would not be correct to miss the point that France has, indirectly, through the astuteness of Saint Bel, in furtherance of the establishment of the Royal College in London, done great things for veterinary medicine in America; still less would it be accurate if we forgot that the great Frenchman, Dr. Liautard, who, by the blessing of God yet lives full of wisdom and honours as of years, was the immediate founder of the first

veterinary college in America. Let it be said, to the glory of the Royal College of Veterinary Surgeons of London, that it gave recognition to the noble work of Liautard by making him an Honorary Fellow. France and England, therefore, have established veterinary learning in the United States, and the scholars of both have fostered it and continue to this day their inspiration, yea, more, their sustenance of it.

The United States of America has been fortunate in the influences which have been brought to bear upon it by the Motherland. At one time it was the fashion to refuse to recognize that English and American history records that English literature, law, politics, social life and social ideals have left streams of influences which have been formative in the United States. The superficial American patriotism of a decade or two ago shut its eyes to the great historic fact of the relation of our literature, law, and governmental opinions to the tree of knowledge and the train of experiences throughout their radiant history of our forbears on the other side of the Atlantic. All this is past and a mutual understanding has been established which is drawing England and America closer year by year. In veterinary medicine, also, but little demonstration is necessary to prove our obligations to Great Britain. Though North America is yet thinly sprinkled with practitioners who have graduated at the Royal College of Veterinary Surgeons of London, these men have always shown their antecedents. In private practice they have been veterinary lights in dark places, and, their training having been ample, indeed, in many instances superior to their competitors, they have been held as estimable professional men to meet and to deal with. The Royal College diploma has been the sesame to success. The training of the Royal College, as shown in its men in private practice, has, unquestionably, had its influence as an indication of the proper training necessary for a fuller success and a better understanding of veterinary problems. Moreover, veterinary education being at a low ebb, at the time members of the Royal College began to come to America, they became favourites for veterinary positions of trust, and they filled them honourably. A river can flow no higher than its source, nor do we expect the product of an institution to be anything less than markedly successful if the veterinary principles engendered and fostered by that

institution are such as to constantly stimulate its members throughout their lives. Can a doctor from the Sorbonne be anything but a scholar? Can he who passes his most impressionable days in an Oxford college, like Christchurch or Balliol, come away without the academic marks on his mind? We must expect, then, that he who has the British veterinary training, wherever that was obtained, and has won his membership in the Royal College, will show in his work his antecedents. Heterogeneous as are the influences which tend to make men, which tend to awaken mental gifts, which start men on a career so that they become extraordinarily successful, of this much we may be sure, that the moulding is done by the educators, by the Gamaliels at whose feet they sat. They say in England that Oxford is famous for the movements for the good of the realm which have started from it; while Cambridge is more celebrated for the numerous remarkable men which it has produced. These are arbitrary distinctions. Men are not made by institutions; yet, without institutions of the highest character, in veterinary medicine at least, not many workers of great value in this field would be found. Like father, like son. As the institution is, so are its men.

I have said that we in the United States were fortunate in the influences which we received from the Motherland, and I have not left it to be inferred that not the least of these influences, in so far as we of the veterinary profession are concerned, has been the shaping of our ideals and the formation of educational standards for us by members of the Royal College of Veterinary Surgeons living in our midst. We have been thrice fortunate in that, from our point of view, some of the best products of British veterinary training saw fit, when they were still very young men, to come to our shores. We count amongst us distinguished names, members of the Royal College of Veterinary Surgeons who have achieved national distinction in comparative medicine in the United States. There are men like James Law, F.R.C.V.S., whose monumental volumes on veterinary medicine, and whose many-sidedness as a veterinary worker, have made him justly famous on both sides of the Atlantic. There is William Haddock Dalrymple, M.R.C.V.S., of whom it may be said that it is a question as to which can more be reckoned in his favour, the number and variety of articles he has

written and speeches made for the improvement of agriculture especially in its veterinary aspects, or the number of honours which have been bestowed upon him in acknowledgment of his services to science. Also Joseph Hughes, M.R.C.V.S., who, with two others, one trained in England, though not a member of the Royal College, the other a graduate of McGill University, Montreal, was the founder of the Pioneer Veterinary College in the agriculturally rich Central West of the United States, and who still, as its President, is revered by thousands of its graduates. There is Albert Hassall, M.R.C.V.S., the scientific expert of the Bureau of Animal Industry, United States Department of Agriculture, whose name has been very frequently bracketed with Dr. Chas. Wardell Stiles, the eminent American zoologist, both men having collaborated on some of the best veterinary zoological work which has been done on the North American continent. Furthermore, there is Austin Peters, M.R.C.V.S., an American by birth but British by veterinary training, who, throughout the proud old State of Massachusetts, and, curiously enough, in the conservative city of Boston, has made veterinary science much more than a name, for he demonstrated its value to the better agriculture of the State, and has for years been esteemed by medical men of all branches and schools, by reason of the value of his services in the application of the principles of this science to the common weal. Finally, there is Alexandre François Liautard, Hon.F.R.C.V.S., the father of veterinary science in America, founder of the first veterinary college on the North American continent, writer of monographs on the science in English and translator of works from the French for our benefit, for years a zealous teacher in New York City, and the instructor of many veterinary leaders of to-day; in his later years an incessantly active journalist residing in Paris, who provides us with the *crême de la crême* of the veterinary journals of Europe; above all, a man of robust amiability who never loses a friend.

Such are some of the distinguished men carrying the mark of the Royal College upon their foreheads, who have helped in one way or another to elevate the veterinary profession in North America. Though in many of the countries of Europe the veterinary profession is hundreds of years old, in some many hundreds of years old, in the United States the profession can hardly be said to have had a life of more

than half a century; for it is not more than fifty years ago since the first veterinary college was founded in the City of New York. Professor W. L. Williams, in this JOURNAL, a year or two ago, found occasion to write of the almost Polar darkness of veterinary education in America, and roundly criticized our backwardness, defending his statements with tabulated statistics, which I daresay few thumbed and less cared about. Criticism, if properly taken, has the effect of a dip in the ocean wave—saline and chilling, it is bracing and strengthening. Professor Williams's articles were good examples of special pleading, and he had some foundation for the facts he presented. But those who remember the articles should also remember that he turned the searchlight on our faults and our limitations alone. As President Theodore Roosevelt said on one occasion: "He turned on the lights, but was not responsible for the conditions which the lights revealed." There is, fortunately, another side to the picture which Professor Williams presented. I refer to the work of the distinguished members of the Royal College of Veterinary Surgeons in America and its effects. Too intense a light on a given aspect of things is faulty. It makes a man negligent of everything except that upon which the intense light is thrown.

As a matter of fact, veterinary education in America, low in grade as it may be on the whole, has progressed rapidly in its few fifty years. No small part of this has been due to the distinguished names of which I am to speak. They have all been educators in one way or another. Results in the veterinary world of America can only with difficulty be traced to the work of an individual leader, as they are indeterminably interwoven with numerous events, all of which have brought about the effects we are accustomed to call veterinary progress. Yet, when a result has been reached, or conditions have been brought about, it is natural to expect that some man or men held the leadership which determined the result or the new conditions. The greatest result of Law's work was the foundation of the New York State Veterinary College at Cornell University, Ithaca, New York, the most scientific veterinary institution in the United States. It will be a lasting monument to his name when all else has perished. Dalrymple, by voice and pen, has been, for well-nigh twenty years, the spokesman for veterinary progress in the State of Louisiana, and his mighty work has been felt

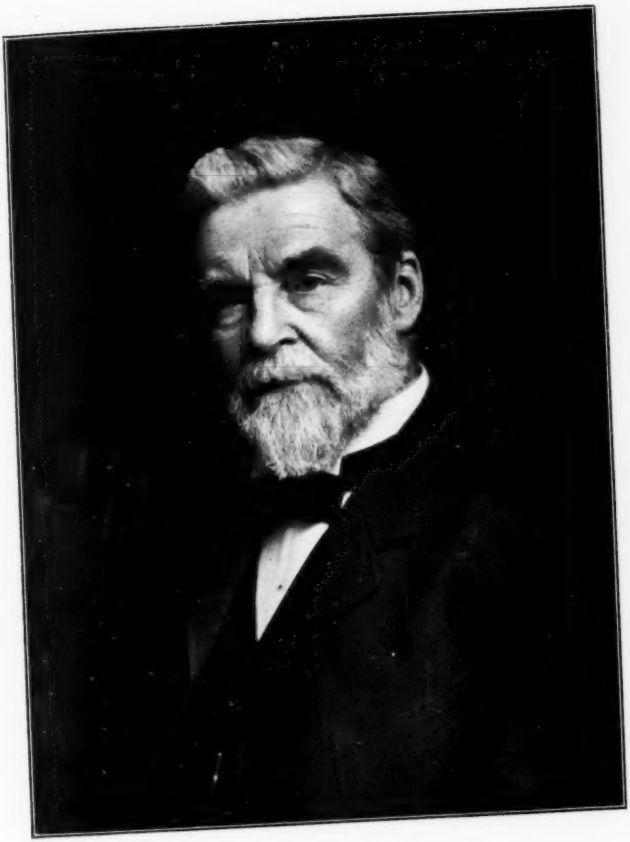
throughout the southern portion of the United States in the awakening of the people to an understanding of the usefulness of veterinary science to their peculiar forms of agriculture. When Joseph Hughes came to the Central West thirty years ago there were no veterinary graduates and no veterinary colleges there. Largely as a result of his work, thousands of able practitioners have been supplied to fill a need for modern veterinarians where they were much desired, namely, among the agricultural people on hundreds of thousands of square miles of fertile land in the Missouri and Mississippi valleys, as well as at distant points. Hassall, as a professor of veterinary zoology in the city of Washington and as an expert in zoology for the United States Department of Agriculture in the capital, has been largely instrumental in diffusing exact information on zoological questions, which has been of service to the whole profession. His name is not the least among a group of American zoologists whose study of parasites amongst domestic animals has revolutionized modern ideas on some of the most perplexing of diseases. The result of the pioneer work of Austin Peters was the appreciation in a State devoted to manufacturing and commercial enterprises of the usefulness of veterinary hygiene and sanitary police to their own betterment, while for many years he was the only veterinarian in the New England States who had charge of live stock sanitary control work. The results of the work of Liautard in the United States are multiple. Opinions will differ upon the question: In what way has Liautard's best work been done? It is as the founder of the first veterinary college, and as the pioneer veterinary journalist that he deserves long remembrance. Whatever veterinary colleges came after that he founded; whatever veterinary journals sprang into being after that he started; to him belongs the praise for priority.

Following these introductory remarks, then, in this article, in which I propose to write of some members of the Royal College of Veterinary Surgeons who have achieved national distinction in comparative medicine in the United States of North America, I shall speak of the life and services to veterinary science of James Law, F.R.C.V.S., William Haddock Dalrymple, M.R.C.V.S., Joseph Hughes, M.R.C.V.S., Albert Hassall, M.R.C.V.S., Austin Peters, M.R.C.V.S., and Alexandre François Liautard, Hon.F.R.C.V.S.

Americans have the reputation in England of being boastful of the riches, the advancement and modernity of their native country. I am in no peril of such a criticism in writing for a British veterinary journal of the successes of their compatriots in this country. We will be very much mistaken if the careers of these remarkable men do not engage the interest of veterinarians throughout the British Empire; nay, more, throughout the English-speaking world wherever the VETERINARY JOURNAL goes. If "one touch of Nature makes the whole world kin," surely the achievements of distinguished veterinarians in the United States will rouse more than a passing interest in the minds of British veterinarians everywhere. Though the human imagination, playing upon biographical material of this kind, tends to idealize upon the actual; though facts passing through the alembic of the mind, when human feelings are intensely aroused, become other than what they were through reverie, we do not intend to stretch the truth nor to stultify it. Sufficient it will be for us if a better understanding is reached, after reading the article, by British veterinarians the world over, of veterinary tendencies in America, and encouragement given the ambitious to equal or excel the subjects of these biographical sketches.

I.—JAMES LAW, F.R.C.V.S.

There has been no more conspicuous figure in the veterinary history of the United States nor in North America during nearly half-a-century, than Professor James Law. An account of even the salient features of the career of this great man would fill a volume—such a volume as authors delight to write in historical or biographical series like the "English Men of Letters Series," published in England, or the "Makers of the Nation Series," in the United States. His career, indeed, is one of which a facile writer would like to deal as a section of one of such a series of volumes as the famous British publications, the "Dictionary of National Biography," edited by Sir Sidney Lee. There is a great deal of the picturesque in the career of this illustrious veterinarian. Like Goldwin Smith, the celebrated litterateur and Professor of Modern History in the University of Oxford—a man who had had a distinguished record in Great Britain—who came to America in the late 'sixties to help found Cornell University in the State of New York, Professor Law,



PROFESSOR LAW.

who also had had a most remarkable record as a veterinary scholar in Scotland and England, also came over to help promote the interests of his science and agriculture in the same State at the same time, and was made a professor in the same institution. Goldwin Smith and James Law were bracketed together in the new university as equally scholarly importations: but in lines of work which were antipodes, or rather which, in those days, were supposed to be antipodes.

In order to compare the British and American parts of his career, because the latter more particularly concerns us in this article, as a preamble I shall speak of his record before he left his native land.

Professor Law was born in the county of Edinburgh, Scotland, February 13, 1838. Till eight years of age he was educated in private and parish schools of West Calder and Livingston; later in the Burgh High School of Dunbar, East Lothian. At sixteen years of age (1854) he entered Edinburgh Veterinary College, where he studied, among others, under John Barlow, one of the first veterinarians of his day; under Finlay Dun, author of "Veterinary Medicines: Their Actions and Doses"; and John Gamgee, the author of "Domestic Animals in Health and Disease"; "Dairy Stock: Anatomy of the Domestic Animals," by Gamgee and Law, &c., the founder of the *Edinburgh Veterinary Review*. Gamgee might well be named the most brilliant veterinarian of his time. James Law graduated in 1857 in a class of 183, the largest that had ever graduated at his Alma Mater, and which included William Williams and Thomas Strangeways, afterwards well known as teachers and writers. Though the youngest member of the class, Mr. Law was awarded the medal for the best examination in anatomy, and shared with Mr. Williams two medals, awarded as two equals, for the best general examination. He became a M.R.C.V.S. in 1863, and a F.R.C.V.S. in 1870. In the year following his graduation (1858) Mr. Law associated himself with John Gamgee in the Edinburgh (New) Veterinary College, taking the position of Demonstrator of Anatomy. In the same institution he successively filled the position of teacher of materia medica (1860-65), and anatomy (1865-67), when, in 1865, the college was transferred to London, as the Albert Veterinary College. Meanwhile he was active as collaborator

on the *Edinburgh Veterinary Review*, contributor to "Domestic Animals in Health and Disease," as veterinary editor of the *Scottish Farmer*, and as the author of the descriptive part of "Anatomy of the Domesticated Animals."

Thirty years of Professor Law's life were thus passed in Great Britain before his coming to America. These years were fruitful in various forms of educational activity, and he had been mellowed through experience as a college teacher and as a writer. If he had remained in England, by every token he would have been a brilliant veterinary leader, and would have gone on from strength to strength, and from success to success, as every sign indicated. But destiny had something else in store for him. Unlike Cæsar, he did not need to yearn for other worlds to conquer, for a way was made open for him to be of even greater benefit to his fellow men than he would have been had he remained in Great Britain. Thirty years he spent there: the next forty years of his eventful life was spent as a pioneer in veterinary science in the New World.

In 1868 Professor Law was called to the Chair of Veterinary Science in the newly founded Cornell University, Ithaca, New York State, United States of America, which he held until 1896. In 1896 he was named Director of the New York State Veterinary College, which that State that year, or just previously, practically through the efforts of Professor Law, had founded and endowed as one of the colleges of Cornell University, taking special charge of the subjects of Veterinary Medicine, Veterinary Sanitary Science and Parasites and Parasitisms in Domestic Animals, 1896 to 1908. In 1908 he retired on the Carnegie pension, after forty years' service in the University.

During this American part of his career he was veterinary editor for the New York *Tribune*, *Livestock Journal*, and, in more permanent form, produced the "Farmers' Veterinary Adviser," now in its sixteenth edition; "Text Book of Veterinary Medicine," in five volumes, now entering on its third edition; and various contributions to standard medical books on veterinary matters. He was consulting veterinarian to the New York State Agricultural Society (1868-1896); chairman of the United States Treasury Cattle Commission, which had to do with the suppression of Lung Plague or contagious pleuro-pneumonia in the early 'eighties; member of the New York State Commission on Tuber-

culosis in Cattle, 1894; and Field Chief of the Bureau of Animal Industry, United States Department of Agriculture, for the extinction of Lung Plague of Cattle in Illinois and the Eastern States. In 1883 he acted as delegate of the United States Department of Agriculture to the International Veterinary Congress at Brussels, Belgium; and as reporter on the "Veterinary Colleges and Veterinary Education in Europe" at that date. In this connection may also be mentioned his active part as consulting veterinarian for the United States Department of Agriculture in the outbreak of foot-and-mouth disease in New England in 1902, and his active charge, as consulting veterinarian to the State of New York, in the work of extermination of foot-and-mouth disease in that State, 1908-1909.

Professor Law has been a many-sided veterinarian, as is shown in the variety of his productions, and the variety of his other activities, in all of which he has been markedly successful. His works are authoritative writings on veterinary science in the United States, whether they appear in text-books, in medical standard works, in agricultural or veterinary journals, in the documents of the State of New York, or in the United States Reports. As a professor he has trained many of the leading veterinarians of North America, such as Drs. Salmon, Farrington, V. A. Moore, and Pearson. Through his efforts the New York State Veterinary College was founded, which will always be a lasting monument to his memory. In the inauguration of legislation for the improvement of veterinary education, suppression of quackery, the examination for licence, as well as in sanitary police measures, Professor Law's brain and hand have frequently been shown. His work for improvement of industrial activities has taken no small part of his time. For the advancement of agriculture, especially by the information he has dispensed in the simplest, clearest English, for farmers, through his books, pamphlets and speeches, he has gained the reverence of untold thousands and their gratitude. While in private practical work, his skill in diagnosis, the sureness of his anatomical knowledge, the celerity in dosage, the large information he possessed on pathology and hygiene, made him a favourite as a consulting veterinarian. On his personal and social side no more thorough gentleman could be met. The nation, the State, the University he served, his profession, have united

to do him honour, and have taken pleasure in acknowledging his many successes and his unselfish services to his fellow-men.

II.—William Haddock Dalrymple, M.R.C.V.S.

In speaking of William Haddock Dalrymple, we are again dealing with a Scotsman, but not one who, like Law, took up his residence in the North of the United States. Dalrymple has been a Southerner of Southerners. Both men have singularly well adapted themselves to the social strata in which they became domiciled, and both with equal speed soon mastered the agricultural problems associated with their science in the new environment—the one in the temperate climate and among the verdant hills of Central New York; the other in the semi-tropical country along the lower Mississippi River, not far from New Orleans.

A few words on the British portion of Professor Dalrymple's career will form an introduction to the American part of his career. He was born at Stranraer, Wigtownshire, Scotland, April 23, 1856. His preliminary education was obtained at the Stranraer Academy, and his professional training was received at Glasgow Veterinary College. He passed the examinations for M.R.C.V.S. in 1886. That year he went to Dublin and engaged in veterinary work, becoming a member of the veterinary staff of the Irish Privy Council. In 1889 he emigrated to America.

Since coming to America he has held, practically continuously until the present time, the position of Professor of Comparative Medicine in the University of the State of Louisiana, located in the capital, Baton Rouge, and veterinarian of the Louisiana State Experiment Stations, such, we may add by way of explanation, as the United States Government supports in each State for the purpose of scientific investigation in the sciences related to agriculture. But this professoriate, to him, has been no sinecure position. Work confined to university routine was not for him. Men of ambition make their university positions only a means to an end—to enable them to reach out and perform work they see should be done, but which is optional for them to do. Dalrymple, in a letter received several years ago, described himself to be "one of those unfortunate men who always wants to do much more than the next man, and to work a little

W. H. Dalrymple

harder just to make things go." Consequently, this university professor has made himself one of the most useful men to the public and to the science in the State of Louisiana, in the Southern States; indeed one of the most useful and influential veterinarians in the country, a fact which is illustrated in the very large number of agricultural and veterinary offices which he has held or is holding, and by the honours which have been showered upon him.

(Another interesting instalment of this series, with photographs, will be produced in the November issue of the VETERINARY JOURNAL.)

THE EPIZOOTIOLOGY OF ANTHRAX.*

BY STEWART STOCKMAN, M.R.C.V.S.

London.

WHEN I was invited to read a paper on anthrax I was very considerately informed that I might choose for my paper whatever features of the disease I preferred to deal with, for it is evident that anthrax in all its features cannot be dealt with in one lecture. I have chosen the epizootiology of anthrax, and, as diagnosis and prevention are most important parts of epizootiology, I have attempted to deal with them as fully as possible.

Diagnosis.

In the cases of cattle and sheep the usual history is that one animal has been found dead or in a moribund condition, and that signs of serious illness had not been observed until shortly before death. Anthrax may or may not be suspected by the owner. Anthrax, however, is not always fatal, and inasmuch as several animals may have contracted the disease from the same source, and be less severely attacked, or in different stages of the disease, it is advisable to make use of such clinical aids to diagnosis as can be applied on the spot to animals in contact. This applies especially to cows in byres, and it has frequently been observed that some of the contacts to an animal which has died of anthrax show a suspiciously high temperature.

In the cases of horses and pigs there are often certain objective symptoms to guide one, such as swelling of the tissues around the throat, and in the former severe colic. These ex-

* Read before the Midland Counties Veterinary Medical Association.

ternal lesions are of great value in connection with diagnosis during life and after death, but, while their presence is strongly indicative of anthrax, their absence cannot be regarded as satisfactory evidence that the disease does not exist.

The irrefutable evidence of the existence of anthrax is the presence of the anthrax bacillus in the body fluids or tissues. The blood is the fluid from which preparations can be most conveniently made for microscopical examination, and, since the bacilli seldom invade the blood-stream in sufficient numbers to be detectable until the animal is practically moribund, a positive diagnosis follows usually upon the finding of anthrax bacilli in the blood after death. It is seldom indeed that the bacilli have not invaded the circulation in large numbers in cattle and sheep just before death, but very occasionally cases of anthrax are met with in these animals in which a microscopical examination of blood from the peripheral vessels fails to reveal the presence of anthrax bacilli, and other methods of diagnosis have to be employed. In pigs and horses it frequently happens that the animals die of anthrax before the bacilli have invaded the circulation in large numbers, and under such circumstances diagnosis by the microscopical examination alone of smears from the blood in the peripheral vessels often fails. It is advisable in horses and pigs to make smears from a gland near the surface and from any œdematous fluid which may be present, as well as from the blood.

Given that these methods of examination have been applied with a negative result, there is nothing left except to seek for the cause of death by an examination of the internal organs, still paying due regard to the possibility of anthrax existing, and taking all reasonable precautions against infective material being disseminated. A great deal of importance is often attached to finding the carcase of an animal tympanitic, with blood oozing from the orifices. Without wishing to minimize the importance of this in arousing suspicion of anthrax, I would like to remark that no conclusion can be drawn from its presence or absence. It may happen that this further examination will tend to increase one's initial suspicions. For example, if enlargement of the spleen be found, with a fluid tar-like appearance of the pulp, or if the intestines and lymph glands are markedly congested, anthrax should always be suspected, and smears for further

microscopical examination should be made from the altered organs.

A fairly common lesion in pigs, and one of great diagnostic value, is the presence of necrotic areas on the mucous membrane of the pharynx. These vary in size, but are commonly as large as a shilling. The centre is dark, almost black in colour, slightly raised, and the edges are level with the mucous membrane. There is seldom any difficulty in finding anthrax bacilli in preparations made from these areas.

In cattle and sheep anthrax may be confused with blackleg. The local lesions of the latter disease are generally sufficient for differential diagnosis, but it must not be forgotten that in sheep dead of blackleg lesions of the skeletal muscles may be very slight, or even absent. It is sometimes stated that the bacillus of blackleg does not invade the blood-stream. This, however, is an error, and the finding in almost pure culture of an appreciable number of bacilli like those of blackleg in preparations made from the blood is almost sufficient evidence to exclude anthrax. In the horse one may be misled during the life of the animal by the belief that it is suffering from serious intestinal trouble. In dealing with the carcase of an animal, however, it is unnecessary to attach a great deal of importance to differentiating finely between the macroscopic lesions of anthrax and other diseases, because, if the circumstances or lesions are such as to make one suspect anthrax, the question can be decided by establishing the presence or absence of a definitely ascertained microbe; these things are happily no longer the matters of opinion which men of the more ancient clinical school found time to wrangle about.

We have next to consider the methods of establishing the presence of anthrax bacilli in fluids and tissues, and microscopical examination naturally comes first for consideration. I take it, it may be assumed that everybody knows what is meant by a smear, that smears should be made from blood present in the peripheral vessels, such as those at the base of the ear, that they should not be made from blood found oozing from the orifices, that in the cases of the horse and pig it is highly advisable also to make smears from a superficially placed lymphatic gland, and that for bacteriological examination an oil immersion lens is indispensable. The smears are fixed by heating the glass slides

over a flame, after the fluid has been dried. Amongst the specimens sent to the laboratory purporting to contain anthrax bacilli a few have been unstained cover-glass smears of blood mounted in balsam, and I have known members of our profession who claimed that they had no difficulty in identifying anthrax bacilli in unstained preparations. This, however, is rapidly becoming a lost art, and one of the penalties we have had to pay for the advance of civilization is that we must now stain our anthrax preparations. The anthrax bacillus is not difficult to colour with any of the bacterial stains, nor is it difficult to identify whatever be the stain employed, provided the material for the smear has been obtained very soon after the death of the animal and the organisms are fairly numerous. The classical description of the anthrax bacillus in preparations from the blood is: A rod-shaped organism measuring 5 to 8 microns by about 1 to 2 microns, ends square cut, or showing cup-shaped depressions, consisting of a central rod of protoplasm bounded by a translucent capsule, occurring singly, or in twos or threes joined end to end, but not as long filaments. To see anything very closely resembling the above picture, one must examine perfectly fresh material taken soon after the animal's death. If one expects always to find it in preparations made under the conditions obtaining in the field of practice, the expectation will not be realized. The veterinary inspector frequently does not arrive on the scene until twenty-four or thirty-six hours, or even more, after the animal has died, and it is common knowledge that in this time even the blood in the peripheral vessels may become grossly contaminated by the organisms of putrefaction, especially during hot weather. These organisms, as it were, crowd out the anthrax bacilli, and as some of them, particularly the bacilli of malignant œdema, bear a certain resemblance to anthrax bacilli, the problem of identification becomes more complicated. Further, it is also well known that anthrax bacilli contained in blood, especially under the anaerobic conditions obtaining in the blood-vessels of an unopened carcase, undergo degenerative changes, and disappear in a variable time. These changes give rise to distorted forms, which, up to a certain point, may aid identification, and beyond that make it more difficult. The central protoplasm may be twisted, shrivelled, and very granular, but the most marked changes are probably observed in connection with the capsules,

which may swell up to several times their original size, and assume curious shapes; they may also rupture. Sometimes the protoplasm inside the swollen envelope takes the stain very feebly, giving rise to what may be referred to as ghost forms. In preparations made from tissue which has been exposed to the air for some little time one may also see anthrax threads of considerable length, made up of bacilli of about equal length joined end to end, and there may even be sporulating forms in warm weather. In the majority of cases, however, the long forms seen in preparations are not anthrax filaments; they are threads of the malignant œdema bacillus, made up of rods of very unequal length, and of greater thickness than those of anthrax when stained in certain ways. Other filaments of bacilli more or less resembling anthrax may also be present when the material has become grossly contaminated.

I have purposely said nothing about motility as an aid to differentiating between anthrax and other micro-organisms, as I consider the manipulations necessary to put it in evidence are too dangerous to be made use of by practitioners. The anthrax bacillus is not motile.

Two methods of staining are particularly helpful in the identification of anthrax bacilli, while certain others should be avoided. First, we may take Gram's method. This is not a good method for staining the anthrax bacillus, as it usually shrivels the protoplasm, renders it very granular, and causes a certain amount of distortion, which may make identification somewhat difficult in certain preparations. On the other hand, it may be usefully employed, when necessary, to distinguish between the anthrax bacillus which is Gram-fast and other somewhat similar microbes which are not—malignant œdema, for example. The most misleading stain of all is gentian violet, which is apt to colour the envelope of the anthrax bacillus, giving the rod an unnaturally thick appearance. This increases the difficulty of distinguishing between it and certain other microbes. The now well known methylene-blue method of staining has the highest diagnostic value of all. As everyone knows, this, as a valuable aid to the identification of anthrax bacilli in preparations made from the blood, was first described by Sir John M'Fadyean. It consists in staining the smears in a 1 per cent. watery solution of methylene blue, and an essential point in the technique is that

the smears must be only lightly fixed. The protoplasmic rod stains blue without undergoing distortion, and the capsule, particularly if it has become swollen, takes on a rose-pink colour. Sometimes the material of the capsule becomes massed, and appears in the preparations as small pink islands; at other times the field of the microscope has a pink, peppery appearance. Even after all the rods have disappeared, one can often find pink masses in a blood-smear.

In my annual report for 1905 certain observations on guinea-pigs dead of anthrax were described, in which the pink reaction was obtained eighty-six hours after death, but was not obtainable 126 hours after death, when the body had been opened; and in another guinea-pig, which had not been opened, a very distinct reaction was obtained in preparations made from the spleen ninety-six hours after death. Since then I have obtained it from scrapings of dried blood from a shed in which the carcase of a cow dead of anthrax had been dressed about a month previously, and I have also obtained it from the spleen of a cow which was exhumed three weeks after death. I do not, however, mean to assert that one can count upon obtaining it at these long intervals after death.

The other aids to diagnosis which one may employ are cultural examination and inoculation. These are methods for the laboratory, but, inasmuch as the laboratory has to depend on the practitioner for material, you will probably desire that I should say something about these methods, and how material should be collected for transmission. When the microscope fails to reveal the presence of anthrax bacilli, or when the material is so grossly contaminated with other microbes that identification of the anthrax bacillus is difficult, inoculation or cultural examination may be resorted to, and it ought to be made use of if the history of the case is suspicious. For inoculation guinea-pigs or white mice are usually employed, and one is almost always restricted to the scarification method in order to avoid killing the animals from malignant œdema. Material which is grossly contaminated, or which contains very few anthrax bacilli, sometimes fails to infect by the scarification method, and on this account it seems probable that the cultural method is the more reliable, because the contaminations can be got rid of, and there is no reason to believe that one or two bacilli or spores are not sufficient to

start a culture, although they may fail to fatally infect an animal. Agar slopes are inoculated with material from a swab, and placed in the incubator overnight to give any anthrax bacilli which may be present the chance to sporulate. The culture tubes, or material therefrom, are heated in a water bath at 80° C. for half an hour. This kills all the non-sporulating bacteria, which are the majority, and by making cultures on agar slopes from the heated material it is possible to obtain relatively pure or even pure cultures of the anthrax bacillus in a matter of hours. Needless to say, the material sent to the laboratory should be collected as purely as possible.

What is now known as the Strassburg method of collecting material has been strongly recommended by many authorities. In this method pieces of gypsum are soaked in broth, which fills the pores, and they are afterwards sterilized in test tubes and sent out to inspectors. The gypsum is dipped in the suspected material and returned to the laboratory. The theory underlying this method is, that the anthrax bacillus finds the conditions for sporulation in the pores of the gypsum, assuming the temperature to be favourable, and may even have sporulated by the time the material reaches the laboratory. Under the conditions prevailing in Great Britain, however, the simpler method of sending to the laboratory smears and a swab of sterile cotton-wool which has been soaked in the suspected material meets the case. This is the method in use by the Board of Agriculture, and I have brought with me an apparatus which has been designed for collecting and transmitting material.

Members of this association will probably be surprised to learn that at this late date in the history of a profession which may justly claim to be a scientific profession there are still men in the position of veterinary inspectors to local authorities who are so forgetful of their responsibilities as to send by post, in cigar boxes and other leaky vessels, portions of spleen and other tissues from animals suspected of having died of anthrax. Apart from the moral obligation involved, I think you will agree with me that it would not advance the prestige of the veterinary profession if any one of its members had to answer a charge of contravening the Post Office regulations in a matter of this kind, or if he were charged with the more serious offence of culpable homicide.

Epizootiology.

The most important factors admitted or suggested to explain the upkeep and dissemination of anthrax are as follows:—

First.—The disease is not disseminated to any important extent by the infected animal during life, but it may arise from a patch of infection established by a previous case on a pasture. It is well known that anthrax bacilli may sporulate under certain conditions, and that the spores are very tenacious of life; in the laboratory they may remain infective for several years. One does not know definitely, however, to what extent spore formation may occur in blood, &c., deposited on the pastures under the climatic conditions obtaining in Great Britain, and it must be

TABLE I.

Showing Total Outbreaks for Five Years—1902-1906—in six of the Worst Infected Counties in Great Britain, together with the Number and Proportion of Outbreaks on New and Previously Infected Farms.

County	Total outbreaks	Number on new farms	Percentage of total Per cent.	Number on previously infected farms	Percentage of total Per cent.
Aberdeen ...	500	400	80	100	20
Somerset ...	143	119	83	24	16
Salop ...	125	112	89	13	10
Wilts ...	78	67	80	11	19
Cheshire ...	218	191	87	27	12
Total ...	1,064	889	83.5	175	16.5

remembered that for several years past it has been customary to avoid the spilling of blood from animals dead of anthrax. Nor is it known how long the spores of anthrax, granted their formation, may remain capable of infecting after their arrival on the pastures. The available evidence is totally opposed to the view that anthrax arises mainly, or even to a great extent, from previous cases on the same establishment. If it did, one might fairly expect to find the disease frequently repeating itself on the same establishments in the same year and from year to year. This does not happen in Great Britain. The information summarized in Table I from the official records clearly shows that the vast majority of outbreaks (average 83.5 per cent.) occur on farms which have not been previously infected, and it is to be noted that it does not necessarily follow that in the remainder

(16.5 per cent.) infection arose from virulent material on the pastures, or from a previous case on the same establishment.

By going through the records in the above counties of the 993 farms infected for the first time during the ten years from 1895-1904, I found that anthrax had occurred more than once during that period on 120 farms, that is, on only 12 per cent. of the total.

With regard to the proportion of farms on which anthrax occurred more than once in any one year, the records over a period of twelve years (1895-1906) for the above counties were examined. There were infected for the first time during that period 1,388 farms, and anthrax occurred more than once in any one year on only fifty of them (4.6 per cent.). These figures were published in my Annual Reports for 1905 and 1906, and since then the records for all the other counties of Great Britain have been examined with practically the same result. In considering the importance of ground infection one must also weigh the fact that although there have been over 500 outbreaks a year in Great Britain for many years, which must have infected an enormous number of premises, the disease has certainly not increased in proportion, and only a small minority occur on previously infected farms.

Table II shows the quarterly incidence of anthrax from 1906-10. It will be observed that there is a marked and constant drop in the number of outbreaks in the third quarter of each year, that is to say, at the time when most stock are on grass, and that there is a decided rise when the animals may be assumed to be running in, and receiving artificial food.

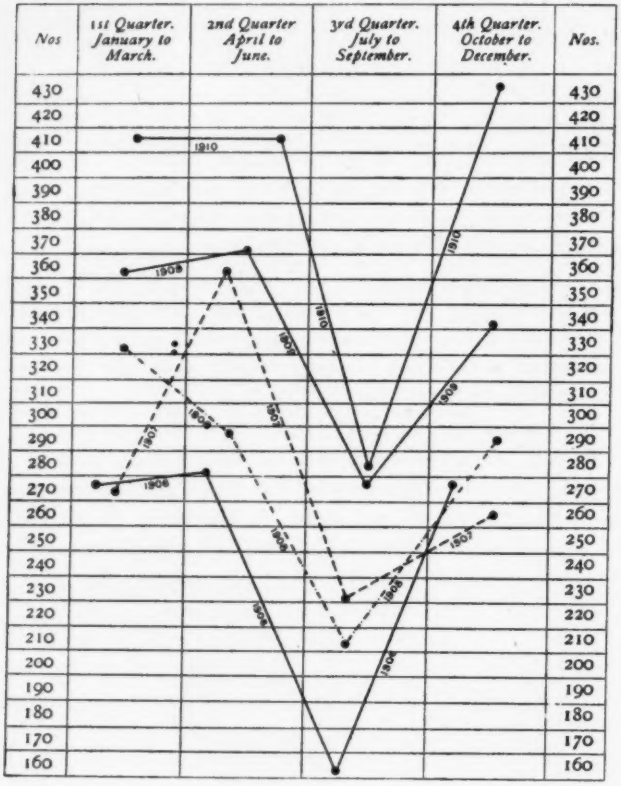
Second.—It is suggested that the disease is carried by flies.

Many are familiar with the sight of flies feeding on the blood of a carcase which has been opened, and one of the oldest suggestions in relation to infection in the case of anthrax is that it may be carried by flies. In a recent report to the Local Government Board, Dr. Graham-Smith showed that living anthrax bacilli could be recovered from the material which flies regurgitate after feeding, and from their fæces, provided they had fed on anthrax bacilli. Cultures were obtained from the fæces forty-eight hours, and from the crop five days, after feeding. After feeding on spores cultures were obtained up to the twentieth day. This, of course, is not surprising, as we know

the spores may live for years. These observations convey the suggestion that flies in the above way disseminate anthrax. I think one must admit that flies could carry infection, but, interesting as Graham-Smith's observations undoubtedly are, there

TABLE II.

Quarterly Incidence of Anthrax in Great Britain, 1906-1910.



is no important gap in the epizootiology of anthrax which his observations can fill. Further, we have every year a certain number of cases in which men contract anthrax from dressing infected carcases. When this happens it is not those helping, on whom flies may, and do, alight, who contract the disease,

but almost invariably it is the man who does the actual cutting, and who has sores on his hands and arms, which come in contact with the blood. Moreover, it is quite obvious from Table II that the number of outbreaks in cattle drops very decidedly during the season in which flies are prevalent.

Third.—Infection may be carried by contaminated feeding stuffs brought in from without, particularly by material brought in from countries where anthrax is very prevalent.

The facts brought out in Table I are strongly in favour of the view that the great majority of outbreaks in this country are due to infection from without. Table III summarizes the information collected in connection with 1,257 outbreaks of anthrax on previously clean farms, where ground infection could not have operated. It is to be observed that only those cases in which the diagnosis was beyond question have been taken, and that special inquiries were instituted into the correctness of the history of the premises.

Evidence that foodstuffs carry infection is very difficult to obtain under the conditions of experimentation, one reason being that the infected portions have probably been consumed by the dead animal before samples were taken. During the last few years samples of feeding stuffs upon which suspicion rested have been experimentally examined at the Board's laboratory with negative results. Both Sir John M'Fadyean and Mr. Dunstan, M.R.C.V.S., however, have demonstrated experimentally that cake may contain the spores of anthrax, and the former has isolated the anthrax bacillus from imported oats. These positive results, few as they are, are of the highest importance to the question under discussion, when one considers how enormous are the chances against obtaining them with the small samples it is possible to examine experimentally.

One has next to inquire how feeding stuffs may become contaminated. In the process of manufacture the material from which cake is made is heated to a temperature considerably below the boiling point of water (180° to 200° F.), which is, of course, insufficient to destroy the spores of anthrax. Compound cakes are pressed between metal plates, but the seed from which the other cakes are made is pressed in cloth bags, made from refuse wool and horse hair, to extract the oil. On the assumption that the material used in the manufacture of bagging might

infect the cake (shoddy wool and horse hair are frequently infective), about a hundred different samples were examined experimentally at the Board's laboratory, but with negative results. Personally, although I cannot free my mind from the suspicion that bagging may infect cake, I think the most likely explanation of infection is that the grain or meal in course of transit from countries badly infected with anthrax becomes contaminated by infective material from dry hides, which, on account of their light weight, are often stowed on the top of other cargo. I have known a number of outbreaks follow the distribution of a consignment of Soya beans in a part of the country where previously

TABLE III.

Showing Results of Special Inquiries into Cases of Anthrax reported from Farms said to be Infected for the First Time (1905, 1906, 1907, 1908, 1909).

Total cases inquired into, 2,527. Deduct 1,270 cases in which the diagnosis could not be confirmed = 1,257.

Confirmed Cases. Total	Number of those which on further inquiry might have been due to a former case (*i.e.*, a death under suspicious circumstances was known to have taken place) (14 per cent.)	Number of those in which no former history of anthrax could be obtained after careful inquiry (83 per cent.)	Number of those in which after careful elimination of other causes the evidence pointed to artificial feeding stuffs or manures (68 per cent.)	Number of those in which there was no history of former outbreaks nor of artificial feeding stuffs nor manures (20 per cent.)
1,257	179	1,046	860	254

anthrax was almost unknown. It should also be noted that there is a possibility of cake being contaminated by infected material after it leaves the factory.

Fourth.—Infection may be disseminated by bone manure, shoddy manure, and refuse from tanneries, which may be put on the land or allowed to contaminate the water supply.

There is no doubt that the disease is exceptionally prevalent in certain districts where imported hides are tanned and wool is washed, the assumed explanation being that the drinking water becomes contaminated by the sewage from the factories.

In the course of inquiry it has also been found that the disease is exceptionally prevalent on certain sewage farms which are known to receive tannery and knackery drainage. With regard to bone manure, I have not obtained evidence that a large number of outbreaks can be accounted for in this way, and it should be noted that most of the bone manure used in this country has been heated, or submitted to a chemical process amounting to disinfection, before it is used on the land. There are outbreaks, however, in which the circumstantial evidence indicates that infection has been introduced with turnips which have been grown on land manured with crushed bones. Given infected particles of bone in the soil, one can imagine that roots with the earth adherent might be infective.

Preventive Measures.

In discussing preventive measures in relation to anthrax, I would like to take further advantage of the liberty you have accorded to me of limiting discussion on my part to certain features, for it would not be possible to deal with every side of this question without prolonging the paper beyond reasonable bounds, and I feel I have already overstepped the limits of your patience. I would like to restrict myself to preventive and curative inoculation, as the part of the subject which is of more direct interest to practitioners.

The Pasteur method of preventive inoculation has rendered great service in preserving stock on badly infected farms in various parts of the world. The method consists in injecting the animals with fixed doses of attenuated cultures of the *Bacillus anthracis*. Two injections at intervals of twelve days are performed. For the first injection a very attenuated culture is used (first vaccine), and for the second a less attenuated culture (second vaccine) is employed. Immunity is established about twelve to fifteen days after the second vaccine has been injected. It lasts in cattle about a year, and should be repeated after this period. The great majority of cattle operated on show little more than a temporary indisposition with passing fever after the injection, which may be assumed to indicate a slight attack of anthrax. Occasionally, however, an inoculated animal may die of the disease as the result of the injection, and for this reason the animals undergoing the process of immunization should be

kept in a special paddock, or, better still, in sheds which can be disinfected in the event of an accident taking place. In sheep, accidents are more frequent. The operation should only be attempted by skilled persons, who will know the best way to prevent accidents, and adopt measures to limit their consequences should they occur.

Since the operation is not altogether unattended by the possibility of loss, and since it incurs a certain amount of expense, one has to consider under what circumstances it will be worth while undertaking it. It will be obvious from the first that on farms registering only one death annually it will hardly be called for, and that it would be folly to adopt it on clean farms.

It results from observations on several millions of cattle in various parts of the world that accidents occur in about .5 per cent. of the inoculated taken all round, and that the operation may be expected to reduce the death-rate from anthrax on infected farms to about 1 per cent. or slightly under.

If accidents threaten to occur from the inoculation, they can be avoided to a large extent by giving a dose of anti-anthrax serum. This serum is useful both as a preventive and as a curative agent under certain circumstances. The immunity following upon an injection of serum is, of course, quite temporary, but it lasts long enough to tide the animals over certain risks. For example, if an animal has died of anthrax amongst other animals and its blood has been spilt, it is advisable to inject the others with serum, and remove them from the infected place if possible. If it is not possible to remove them, it is even more desirable to give each a dose of serum to protect them while disinfection is being carried out. The immunity from serum lasts about ten days. When a case of anthrax has occurred, from infection by cake or from preventive inoculation with virus for example, and any of the animals in contact show an abnormally high temperature, a dose of serum should be injected. Unless an animal has been very heavily infected, which does not frequently happen in practice, the infection remains local for a long enough period to enable serum to act.

The chances are very much in favour of saving the life of the animal by the use of serum, provided the blood-stream is not yet invaded by the bacilli. Once the blood-stream is invaded, serum is likely to fail.

ANTHRAXIN AND ANTHRAXINE.

To the Editor of the VETERINARY JOURNAL.

DEAR SIR,—We notice in your issue of the VETERINARY JOURNAL of September, 1911, a reprint of an article entitled "Anthrax, with Special Reference to the Production of Immunity," by C. F. Dawson, M.D., D.V.S., the original article having appeared in the "Bulletin 137, Bureau of Animal Industry." On p. 531 we notice a paragraph referring to a product called "Anthraxin" (spelt without "e" at the end), which, by the way, seems to have given no immunizing results against anthrax, according to Mr. Dawson's opinion. We beg to call your kind attention to the fact that our Company prepares a vaccine against anthrax which is called "Anthraxine" (spelt with "e" at the end), and which has been on the market for several years past, is presented in cord form, similar to our "Blacklegine" (vaccine against blackleg), and are happy to state that everywhere our "Anthraxine" has been used it has always given the best results, and has successfully stood all the trials and experiments made with it by most eminent bacteriologists and several institutes who have recognized its real value and efficiency.

We beg to enclose herewith a circular for our "Anthraxine," and in order to avoid a regrettable confusion (for us) in the minds of the veterinarian public and your readers in general, we would certainly be greatly obliged if you will insert in your next issue, stating that the "Anthraxin" referred to by Mr. Dawson has nothing to do with our anthrax vaccine in cord form, called "Anthraxine," and prepared by the Pasteur Vaccine Company, Limited, a note to offset and clear that paragraph of Mr. Dawson's article in your September issue. A copy or two of your issue containing that rectification will be cheerfully received and promptly sent their price to you.

Yours very faithfully,

H. DEPERDUSSIN.

Secretary of the Pasteur Vaccine Company, Limited, for Paris.

THE SURGICAL RELIEF OF ROARING.*

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FIVE years ago I presented a communication [13] to this association upon a proposed operation for the relief of roaring in horses, which was discussed by four members, the most enthusiastic of whom was Prof. Merillat, who remarked: "The fewer cases we meet of this kind (roaring), and the less we see

* A paper read before the American Veterinary Association at Toronto, August 24, 1911.

of them afterwards, the better. I like to do a roarer operation as many miles away from home as possible."

The following year I presented a second communication [14] on the subject before this body, and but two members entered into the discussion, though Merillat had developed more courage and was not so unwilling to operate near home.

When Prof. Merillat requested a third communication upon this topic, two strong reasons for consenting presented themselves:—

(1) The two preceding communications might be called prophecies of things hoped for, while the third could be a relation of achievements.

(2) It then seemed probable, which has later been happily realized, that the third communication would be strengthened by the presence and participation of Mr. F. Hobday, F.R.C.V.S., of London, through whose initiative, and against much prejudice, the operation was introduced into Great Britain in 1909, and who, in the brief intervening time, has operated with brilliant success upon a greater number of roarers than any other veterinarian in the history of the profession.

The past five years have been crowded full of interesting developments in this operation. It has had its triumphs and defeats, its encouragements and its obstacles. It has been bitterly assailed and enthusiastically championed, has been looked upon with hope, despair, incredulity, doubt and disrespect. Yet, amidst all these rapid changes and numerous distractions, the operation has moved steadily forwards, and stands to-day securely fixed as a highly valuable surgical procedure.

The history of the growth of the operation for roaring is long, but not voluminous.

The investigations finally leading up to the present operation were begun in 1834, seventy-seven years ago, by the Professors F. and K. Gunther, father and son, Professors of Surgery in the Hanover Veterinary School.

In the first publication by K. Gunther in 1866 [4], he briefly recounted the experiments made by his father and himself, in which six plans were tested, all concerned with the vocal apparatus, the arytænoid cartilages, vocal cords and laryngeal ventricles. Briefly, they removed the vocal cords on both sides, the vocal cords and inner ventricular wall on the diseased side

only, partially excised the left arytænoid cartilage, performed complete arytænectomy, and excised the mucosa of the left ventricle. The five first each had for its object the removal by excision of the obstructing tissues, while the sixth plan had for its aim the causing of adhesion of the vocal cords and arytænoid cartilage to the inner face of the thyroid cartilage.

In 1893 K. Gunther [5] published a special monograph upon the subject, and in 1896 [6] a second edition of this work. During sixty-two years the Professors Gunther pursued their investigations, apparently wholly upon experimental animals without ever operating clinically upon a patient or advising their students or others to operate.

In each edition of the above-cited monograph, K. Gunther asserts that at that date no reliable surgical relief for roaring was known, and advised tracheotomy as the most satisfactory method of handling the disease. In the meantime Cadiot [1], Fleming [3], Hoffman [9], Moeller [10], Vennerholm [11], and others had joined in the task, all devoting themselves to the problem of securing a more reliable technique for arytænectomy, each having a degree of success upon which high hopes were built, but slowly the zeal of each abated, until, when my first communication was presented five years ago, the words above quoted from Merillat were about as optimistic as could be heard anywhere in the veterinary world.

In this country, Butler, Harger, myself and others tried to follow the technique of Fleming or Moeller, and later McKillip and Merillat attempted to bring about adhesions or contractions of the vocal cords in a manner to hold the arytænoid cartilage and vocal cords out of the lumen of the larynx. Such, briefly, had been the history of the attempts at the surgical relief of roaring.

In my first communication, the operation consisted of three separate procedures:—

(1) I performed tracheotomy as a preparatory operation.

(2) Laryngotomy was performed by incising, on the median line, the cricothyroidean ligament, the cricoid cartilage and the crico-tracheal ligament.

(3) The mucosa from the laryngeal ventricle was removed along with the vocal cords and the underlying thyro-arytænoideus muscles.

Neither the preparatory, the invading, nor the basic operation was wholly satisfactory.

The preparatory operation, tracheotomy, now and then did its baleful work of inducing chondritis and tracheal stenosis, as occurred in one valuable animal upon which I operated at our clinic in New Haven. In 1907, upon the presentation of the second communication, Merillat unsparingly criticized this operation as needless and dangerous, and experience has proved his criticism eminently correct.

The laryngotomy was quite as unsatisfactory. The severed cricoid suffered from chondritis, and laryngeal stenosis ensued.

It was then decided to try severing the thyroid cartilage instead of the cricoid, but that was at best no improvement, and this part of the operation remained unsatisfactory and the results were all too often disastrous.

I was about to return to the severing of the cricoid cartilage as safer, when, in October, 1909, I discovered that one could readily operate through the crico-thyroid ligament alone, without wounding either adjacent cartilage. Soon thereafter I had a communication from Professor Cary [2] stating that he had been performing a similar operation through the crico-thyroidean ligament for some months before I had believed it practicable.

Having demonstrated the operation to Mr. Hobday in London in 1909, as soon as convinced of the practicability of operating through the crico-thyroidean ligament alone, the fact was communicated to him. He had already been independently working to the same end, and in his first publication upon the subject Hobday [7], by reference to my letter, was the first to publicly announce this final improvement in the technique of the laryngotomy.

The basic operation itself has undergone important evolution. At first the ventricular mucosa was removed along with the vocal cords, and the underlying thyro-arytænoideus cartilage, by which the arytænoid, robbed too largely of its attachments, fell down into the cricoid ring, adhered there, and partially occluded the air passage, causing a type of roaring. Then began a gradual contraction of the operative area, first removing, in addition to the ventricular mucosa, only the mucosa covering the vocal cords, and preserving the cords themselves, along with the thyro-arytænoideus muscles lying beneath. That idea was

not very practical. The vocal cords and thyro-arytænoideus muscles were badly wasted, were devoid of contractile power, and were worth but little as a stay for the angle of the arytænoid cartilage, so that experience gradually led to a restriction of the basic operation to the ventricular mucosa, leaving the vocal cords intact.

Naturally, as well as fortunately, each individual operator varies the details of technique somewhat, according to his personal views, but fundamentally there is agreement. The technique as at present followed by the writer is as follows:—

The horse is cast or secured upon the operating table in the lateral position, anæsthetized, turned upon his back, a running noose placed upon the lower jaw, the halter or other headgear removed, the head completely extended upon the neck by drawing upon the cord on the lower jaw, and the operative area shaved and disinfected.

An incision about 6 in. to 8 in. long is then made on the median line with a scalpel, beginning over the body of the thyroid cartilage and extending beyond the cricoid cartilage, severing the skin and the sterno-thyro-hyoideus muscles. Care should be taken to keep the incision as accurately on the median line as possible in order to limit the hæmorrhage to the minimum. This incision completed, the thyroid cartilage, the crico-thyroid ligament and the cricoid cartilage are brought clearly in view.

After controlling the hæmorrhage from the cutaneo-muscular wound, a longitudinal incision is to be made through the crico-thyroidean ligament. This incision needs be accurately on the median line, lest the scalpel pass behind the artænoid cartilage, between it and the thyroid, resulting in a division of the artænoid attachments, with unnecessary and probably injurious mutilation. It is safer to begin the incision by placing the back of the scalpel against the anterior border of the cricoid cartilage, with the scalpel point directed somewhat backwards, towards the chest, pushing it through the membrane and then extending the incision forward to the thyroid cartilage.

The wound thus made is next to be dilated to its maximum and held open by means of self-retaining retractors, such as the appendicitis speculum of Mayo. Any blood which may trickle into the larynx should be carefully wiped away by means of pledgets of absorbent cotton or sterile gauze held with a long

pair of forceps, such as human uterine dressing. Since any blood in the larynx, by absorbing light rays, interferes seriously with the illumination of the operating field, it is highly important for accuracy in operating that the hæmorrhage be carefully controlled and all blood kept out of the way. Adequate illumination of the larynx is highly essential. It is most uniformly and reliably secured in a moderately lighted or even dark room, with a reflecting electric lamp on an extension cord. Illumination may also be had with the dry cell pocket electric lamps, though in such cases it is best to have a second lamp in reserve should one fail to work.

In a well-lighted room, good illumination may be had if the horse is secured with his head away from the window or door, so that the rays of light may enter obliquely from behind and above, forwards and downwards. If the position of the horse is reversed so that the light rays enter the larynx obliquely from above downwards and backwards, the seat of operation is thrown into shadow, with a troublesome illumination more posteriorly.

If the weather permits of an operation out-of-doors, good illumination is practicable, except that the operator needs be careful to secure the animal with its head away from the sun, so that the rays of light will enter the larynx obliquely from above and behind in the manner already described. Otherwise the glare of the sun in the operator's eyes and the shadow cast upon the site of operation combined renders accurate vision impossible.

The basic operation consists in grasping the ventricular mucosa at its border with a pair of curved uterine dressing (or other similar) forceps, capable of taking an especially secure hold at the end. I habitually grasp the mucosa first along the anterior border of the ventricle close against the inferior border of the arytænoid cartilage, and then, with the razor-shaped scalpel, incise the mucosa near to and parallel with the margin of the ventricle, and extend this incision in both directions from the engaged point, along the border of the ventricular opening, until finally the two incisions meet and the ventricular mucosa is isolated from the general mucosa of the larynx.

I have found it convenient, after the incision through the mucous membrane has been begun, to draw gently upon it with the forceps, with which it was grasped at first, lifting it upwards in such a manner that another section of the mucosa may be

readily grasped with a second pair of forceps, then by alternating between the two pairs of forceps the mucosa at the margin of the ventricle may be lifted up section by section and held tense while the incision is made.

When the incision through the mucous membrane has extended until the entire ventricular opening has been surrounded, the isolated portion is to be detached and removed by exerting gentle traction upon the incised edges, while, with the razor-shaped scalpel, the membrane is carefully separated from the underlying tissue. In this process, the operator is to remember that the ventricle extends obliquely downward behind the vocal cords and towards the crico-arytænoid articulation, and that the scalpel should be so directed as to avoid puncturing and mutilating the ventricular mucous membrane. When the ventricular mucous membrane comes away, the operator should draw it over the end of his finger to see that it forms a complete sac, in which case he knows that the operation is perfect. If the mucous sac is mutilated, the operator needs search the ventricle carefully and remove any patches of mucosa which may have been left behind.

Any blood is then to be carefully wiped away from the operation field and the larynx, the parts disinfected, and the patient allowed to get up.

The wound inevitably becomes infected, and should accordingly be left entirely open to permit of the free exit of wound secretions. Soon after the patient has regained his feet, and the very slight hæmorrhage has ceased, the laryngeal and ventricular wounds should again be carefully disinfected. Using the long dressing forceps, the ventricular wound may be well disinfected by using a small pledget of cotton saturated with the disinfecting liquid. The disinfection of the cutaneo-muscular wound should be repeated twice daily for three or four days, and then once daily till healed.

The horse should be kept under close watch for the first twenty-four to forty-eight hours of possible dyspnœa, especially in cases of the bilaterial operation. Severe and even fatal dyspnœa may arise as a result of blood coagula in the denuded ventricle, œdema, or emphysema of the ventricular connective tissue, &c.

The dyspnœa may be overcome in a variety of ways. Tracheotomy may be performed, but only with the usual dangers from

chondritis and tracheal stenosis. In many cases a strong suture applied to the margin of the laryngeal wound, each suture passing through the crico-thyroidean ligament and the muscle and skin, and then tied tightly over the back of the neck, may serve to open the incision and permit the entrance of air in many cases. The best and safest method is the application, through the existing wound, of a simple laryngeal tube with tapes to tie over the neck, additional security being given by inserting a strong suture in either side of the wound and tying the laryngeal tube securely to them. The tube should be flattened laterally and merely large enough to furnish breathing room with the animal at rest. The tube should be omitted as promptly as is safe. The healing of the wounds requires for completion about twenty days, and the patient is then ready for moderate exercise, which may be gradually increased to full work in six to eight weeks.

Briefly, the operation as described has as its basis the procuring of a firm and permanent adhesion to the thyroid cartilage of the left arytænoid cartilage and vocal cord, and, in cases of bilateral disease, also of the right cartilage and cord, through the obliteration of the laryngeal ventricle, without involving any injury to a cartilage in any part of the operation.

The operation is surrounded by the customary dangers of confinement, chloroform syncope, chloroform pneumonia, and wound sepsis.

While the operation is not difficult, it is one of delicacy, falling within the province of the trained surgeon. A few months ago an article appeared by an eminent veterinarian, who proposed a radical change in the technique of this operation, which he said, if successful, would give an operation which anybody could do. When anybody and everybody attempts surgical operations, we know well the results, as for example in ordinary castration. Of course his easy road to success has not yet reached the goal, and never will. The surgical relief for roaring will always remain a surgical operation, to be performed by a surgeon. But it can be performed by any surgeon of reasonable skill.

Aside from the dangers common to all surgical procedures, the only one observed under the present technique is strangling during the first twenty-four, or possibly forty-eight hours. One fatality from this cause occurred in our clinic, due to an error on the part of the caretaker. The danger is readily avoided by the timely use of the laryngeal tube.

Under the present technique, the majority of cases are cured, and will pass a veterinary examination for soundness, and, aside from the inevitable dangers related above, the others are benefited in varying degrees, practically all of them being rendered decidedly more serviceable.

The partial or complete failures are due to a variety of causes, some of which are already well known. In some of our earlier cases, imperfect recovery was due to the removal of the vocal cords and the posterior thyro-arytænoideus muscles, so that the arytænoid cartilage dropped down into the lumen of the cricoid and became firmly adherent there. This difficulty has been overcome by the present technique. In one of our cases incomplete adhesion of the cartilage occurred, a cavity continuing lined with mucosa. Possibly the mucosa was drawn into the space from which the ventricular mucosa had been removed, through cicatricial contraction, but we believe that it was due to our overlooking a portion of the membrane and failing to remove it. A second operation overcame the difficulty.

Woodruff [15] records that in one case he deviated from the technique above recommended by suturing the cutaneous incision. The horse died from sepsis. He also advises that the arytænoid cartilage be secured and retained in the desired position during the healing process by means of a wire loop. He further advises that, in detaching the ventricular mucosa from the underlying tissues, a scalpel handle or other blunt instrument be used. We believe that this causes a greater mutilation of the parts and a greater detachment of the arytænoid from the thyroid than the above described technique. We are not sure that this is best. We have advised instead that the ventricular mucosa be dissected out as neatly as possible with a scalpel, that a minimum of the adjacent areolar tissue be removed, and that the attachments of the arytænoid to the thyroid be disturbed to the least possible extent.

Variations in procedure, with faithful records of the results, constitute the only practicable road to improvement in the now immature technique. On the other hand the technique given assures highly satisfactory results and any important deviations therefrom should first have serious consideration and be capable of overcoming some notable defect which experience has pointed out.

In some cases the operation has failed because it was limited to the left side when the right was also involved. This error has crept into our conception of the nature of roaring and it has been too commonly taught that roaring is so commonly unilateral that the involvement of the right side of the larynx may be safely ignored in practice. Experience contradicts this assumption, and shows a considerable number of very definite involvement of the right side. The deception has been accentuated by comparing the movements of the left and right sides of the larynx when the horse is under anæsthesia, when the left cartilage may be quiescent and the right may still move to some extent. It should be remembered, however, that a horse may roar badly when both cartilages move quite freely. If the muscular apparatus of the larynx is weakened so much that under severe stress the arytænoid cartilage and vocal cords cannot be held in complete abduction, the air stream impacts into the ventricles, balloons them and push the cartilages and vocal cords into the lumen of the larynx, and the animal roars.

The error of operating on one side only when both are defective may usually be avoided or overcome by one of three methods.

The experienced surgeon may determine the condition of the laryngeal muscles on both sides by palpating the larynx of the standing animal and determine whether the uni- or bi-lateral operation is demanded.

The operator may follow the plan proposed by Hobday and make the bi-lateral operation the rule.

Or if the error of operating on the left side only, when both are diseased, has been made the defect may be overcome by a second operation.

While the present technique is of less than two years' standing, the prognosis is based upon a much longer period leading back to 1905, when the plan of operation was initiated from which the present technique has been evolved. During the six years which have elapsed no animal which had apparently been cured has again become a roarer, so far as recorded, except from tracheal or laryngeal stenosis resulting from wounds of the cartilages. The cartilage wounds having been eliminated there is no evidence to suggest that a horse once made respiratorily sound by this operation will ever again roar, because of the disease for which the operation was performed, or from any sequel to the operation.

In the clinics of the New York State Veterinary College and subsidiary thereto, my instructor, Dr. Frost, and myself have operated upon twenty-one horses by the present technique. One needlessly died from strangling due to œdema at the site of operation. Five, or 24 per cent., were not entirely cured, but were quite satisfactory, and fifteen, or 71 per cent., were completely cured and would pass a veterinary examination for soundness.

A colleague purchased as an investment, in the open market, twenty-five roarers. One died from purpura hæmorrhagica apparently not dependent upon the operation. Two were not benefited and were sold without the nature of the failure having been determined. Two were much improved and sold at a profit. Twenty, or 80 per cent., were resold in the market where purchased as sound.

Hobday [8] reports 112 successive satisfactory operations with a large percentage of complete recoveries.

Woodruff [16] reports the results in twenty-eight cases with fourteen recoveries, or decided improvement, five slightly improved, seven not improved, and two fatalities. One died from suturing the cutaneous wound, the other to intra-tracheal abscess, without any known connection with the operation. In general Woodruff departed so far in his technique from that described above that his statistics are scarcely applicable for judging of the merits of the operation.

The technique above described is admittedly immature. The question of anæsthesia merits discussion and the instruments for the operation may very well be improved in various particulars.

The after-handling of the wound is unsatisfactory in that there is much odour for some days. Some way should be devised for overcoming this.

It remains to be determined just how much of the mucosa had best be excised from about the mouth of the ventricle. The present plan is to limit it strictly to the ventricular mucosa. The point is a highly important one because the degree of success apparently rests fundamentally upon the exactness of the judgment of the operator in the amount of the mucosa to be removed.

If the amount removed causes a complete obliteration of the ventricle and the adhesion of the arytænoid cartilage and vocal cords above the cricoid cartilage and in complete abduction the

cure is complete. If too much or too little of the mucosa be removed the result may be incomplete.

We do not yet know that the amount of mucosa to be removed varies between severe and mild cases of roaring, nor that the operation is more successful in the severe than in the mild affection. If the operation is more successful in the severe cases the paralysis may be completed by the surgeon by dividing the recurrent nerve; if more successful in mild cases it would be advisable to operate early in the course of the malady.

The question of whether we should perform the uni- or the bi-lateral operation as a rule of practice cannot yet be settled. The bi-lateral operation unquestionably increases the danger of dyspnœa for the first twenty-four to forty-eight hours, but this can be easily obviated by the insertion of a laryngeal tube.

If the operator fails to recognize the presence of disease on the right side and operates only on the left, the animal continues to roar and a second operation is necessitated. The danger from the second operation, combined with that of the first, is probably little if any greater than from the bi-lateral operation alone, but the expense and delay are doubled.

The advisability of the bi-lateral operation in case of bi-lateral roaring would seem to be beyond discussion. When the right side is sound we fail to see how the condition can be improved by the operation. The difficulty arises, and the chief recommendation for the bi-lateral operation rests chiefly in the uncertainty of diagnosis.

Personally, I yet prefer to operate on both sides only after diagnosing bi-lateral disease by palpation upon the standing animal.

In order to examine the left side of the larynx, the surgeon takes his place on the left side of the neck of the horse, facing in the same direction. The head of the patient is held slightly extended and in a straight line. The palm of the right hand is placed against the lateral surface of the superior extremity of the trachea, the thumb directed downward, the index and second fingers held closely together, flat upon the trachea, directed toward the larynx, the second finger lying in contact with the antero-inferior border of the tendon of the sterno-maxillarus muscle.

Pushing the index and second fingers gently upwards and

forwards between the lateral surface of the larynx and the median surface of the angle of the inferior maxilla, the wing of the thyroid cartilage is followed to its supero-posterior border. If the horse is a roarer, the paralysis and atrophy of the crico-arytænoideus posticus and the arytænoideus muscles leads to the formation of a distinct cavity into which the finger tips readily pass, and the border of the thyroid cartilage, no longer covered by the full muscles, stands out as a bare, sharp border.

The procedure is repeated on the right side in a corresponding manner. If the right side is sound the arytænoid cartilage may still be *pushed* inward, but in case of disease and atrophy the depression is not made but already exists and the finger tips pass into it without resistance.

An interesting question has been raised in some of the published discussions in England regarding the status of a horse as to soundness, which has been a roarer, and in which the symptoms have been removed by this operation. Opinions will vary according to the definition of soundness and the faith in the permanency of the healing process. Once the roaring has been obliterated or benefited by this operation, we have not known of the recurrence of the roaring as the result of any retrograde process in the basic operation itself. When the adherent arytænoid is so placed that it cannot drop into the glottideal opening, the fixation is permanent. No instance has yet been recorded of exuberant granulations at a later period.

In our earlier cases, where cartilaginous wounds were made in our invading incisions, dyspnœa sometimes followed as a result of chondritis months after an apparent cure, but these are aside. When roaring has been removed by excision of the mucosa from the laryngeal ventricle, and the firm adhesion of the arytænoid to the thyroid, the horse is sound of wind. If the roaring is ameliorated at first, the breathing tends to *improve* instead of growing worse with the lapse of time. If a horse has been cured of *Laryngismus paralyticus sinistra* by the excision of the left ventricle, he may later roar from *Laryngismus paralyticus dextra*, but in so far as the roaring being caused by the left arytænoid and vocal cord dropping in is concerned, it is analogous to the removal of the vermiform appendix in man as related to future attacks of appendicitis, or as in the case of the operation we have practised and advocated for some years for poll evil in horses, as

related to a recurrence of that malady. He is, therefore, in the light of our present knowledge, respiratorily sound. His respiratory organs proper have not been disturbed.

He is, however, permanently and irrecoverably unsound in his voice. The operation is not wholly responsible for the loss of voice, it having been already more or less seriously disturbed by the laryngeal paralysis, the operation merely completing what the disease had begun.

Some have protested against the performance of the operation upon entire animals which may be later used for breeding purposes, based upon the general belief in the hereditary character of the malady. It is possible that at some future time the question of the heredity of roaring may be re-opened and discussed from new standpoints.

Heredity is a broad and intricate subject. The horse is hereditarily predisposed to roaring as compared, for example, with the cow. That is, a generic heredity from which the only escape is the abandonment of the genus, or fundamentally changing the character of the horse through selection extending over eons of time.

In Hobday's [8] tabulated report, out of 112 animals operated upon, 94, or 84 per cent. of the total, are classed as hunters, leaving 16 per cent. scattered among other classes. One might conclude from these data that the race of horses known as hunters has a racial heredity towards roaring, from which there is no escape except by abandoning the race or for sportsmen to select their mounts from amongst Clydesdales or similar breeds. Or one might conclude from the same data that following the hounds causes roaring, and that hunting, not heredity, is the cause.

The evidence of an individual hereditary tendency to roaring has always been vague. It has consisted chiefly of the fact that, in a region where roaring prevails, a sire which is a roarer begets roarers, as has been instanced of Ormonde in England, but the fact that Ormonde, a roarer, transported to America, begot sound horses is not weighed. Yet it is believed that, had he been taken to another section of America, his get would have been roarers.

Freely admitting that roaring is hereditary in a given sense, it may be worth our while to study *how* it is hereditary.

We might select a group of affections or defections which

most veterinarians would agree are often hereditary, such as curby hocks, cryptorchidy (monorchidy) and congenital herniæ. We would say that these are due to congenital defects in the structure of the fœtus and that they represent what we may term a "Heredity of Degeneracy."

We have other instances of the hereditary transmission of a tendency to disease which stand in direct opposition to the preceding. The fatal disease known as azoturia attacks a special type of horse, a strong, vigorous, courageous animal of high efficiency, which can only be produced by the mating of a sire and a dam of similar character. The horse stricken with azoturia has inherited from his parents a tendency to the disease.

Another equally, if not more, striking example of the hereditary transmission of a tendency to disease is the parturient paresis or milk fever of cows. The cow so stricken is generally the progeny of an efficient dairy cow and of a bull with a pedigree which warrants the assumption that his daughters will prove efficient milkers. In azoturia and milk fever we have what may be termed a "Hereditary of Exalted Function," which predisposes to disease.

However strongly we may believe in the hereditary character of these two maladies, we do not exclude such animals from the breeding stud; it would be a "Philosophy of Despair." It would stand as an insurmountable obstacle to advancement in animal husbandry. Instead we determine and remove the exciting cause of azoturia and eliminate its ravages, while, thanks to Schmidt, we have an efficient remedy for milk fever which has robbed it of its terrors.

Admitting that there is a hereditary transmission of a tendency to roaring, is it a "Heredity of Exalted Function" or a "Heredity of Degeneracy"? If roaring falls in the former class, is it just to absolutely condemn an affected sire in spite of whatever excellencies he may possess, or to unqualifiedly condemn the operation upon animals capable of breeding?

Numerous instances are recorded of extensive enzootic outbreaks in Europe of roaring due to the feeding of *Lathyrus sativa* (damaged?), and in America similar outbreaks have occurred in the absence of vetches or other legumes in the food, apparently due to mouldy maize (the writer) or other contaminated grain or forage. To what extent is improper food,

housing, or other environment responsible for the comparatively isolated cases of roaring?

A re-opening of the question of the etiology of roaring, followed by a frank and careful study from every point of view might reveal to us a more practical knowledge of its essential etiology and lead to efficient prophylactic measures.

In the meantime we fail to see how a veterinarian can logically refuse surgical relief to a stallion or mare afflicted with roaring on the ground that the animal may later be used for breeding purposes. The future use of the animal is a problem beyond the jurisdiction of the veterinarian. The animal needs and demands relief and the professional duty of the surgeon is plain. The problem of the future identification of these animals, and their exclusion from the breeding stud is another matter, upon which there may well be opposing views.

Regardless of the overwhelming, if not universal, belief in the essentially hereditary character of roaring, it must be self-evident alike to veterinarians and breeders that, with an efficient surgical operation in sight for the relief of the disease, breeders will become less and less exacting in relation to the freedom of sire and dam from roaring. It consequently becomes of greater importance than ever before that its etiology be clearly determined. If it is a "Heredity of Degeneracy," far more rigid measures than heretofore should be taken for eliminating the taint from our breeding studs; if a "Heredity of Exalted Function," the veterinary profession should arouse itself to a vigorous prosecution of the search for the immediate exciting cause, and remove it.

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THE MERITS OF WILLIAMS' OPERATION FOR ROARING.*

BY FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
Kensington, W.

GENTLEMEN,—It was with great pleasure that I acceded to the honour offered to me by the request of Professor Merrillat to prepare a paper upon the merits of Professor Williams' work in connection with "Roaring," a disease which has baffled many investigators during the past hundred years, and I am proud to have been his first collaborator in England and to have made the attempt to further the good work of which he has undoubtedly been the pioneer; but the generous way in which Dr. Williams has always acknowledged work done by other investigators cannot but be put to his credit, and, after all, it is not so much the man who originates ideas who benefits his fellowmen as the one who applies them to a useful end and sees them through until on a safe footing.

Give Professor Gunther all the credit of having tried the operation experimentally, for no man worked more earnestly, but so far as I am able to judge from inquiries made, both in England and in Germany, his results were so unsatisfactory that he not only gave it up himself, but advised his students not to practise it. The translation of his own words: "On account of the uncertainty of the results I never recommended my operation, nor did I allow my students to practise it."

* A paper read before the American Veterinary Association at Toronto, August 24, 1911.

In any case, I do not think his technique can have been the same as that advised by Dr. Williams, for the results as published both by the latter and myself are certainly sufficiently good to make one assert very emphatically that the operation has come to stay and take its proper place as one of those which the modern veterinarian may recommend to his client, affording, as it does, a reasonable prospect of alleviating a very distressing condition even if not effecting a complete cure.

The actual technique of the operation has already been described to you by Williams in the paper he read before the American Veterinary Medical Association in 1906, and although there have been some few modifications since, especially in the avoidance of injury to cartilage, the principles are still the same. I myself lay claim to a few originalities in these modifications; but, from communications with Dr. Williams, I find that certain operators on your side of the Atlantic were then working along the same lines at the same time. I refer principally to the ideas of operating only through the crico-thyroid ligament without injuring either the thyroid or cricoid cartilage, and to the double stripping of both ventricles.

In reference to the latter I have altogether operated now upon over 450 individual horses, more than 200 of which have systematically had the double stripping operation done at the one and the same time; but unluckily such a large proportion of these will not be tested until this winter's hunting season commences, that I cannot in the present paper give you statistics as to the actual results or make the very necessary comparison between the merits of the unilateral and the bilateral operation. I will, however, promise that you shall know them, for although, as Editor of the VETERINARY JOURNAL, I shall naturally desire my own paper to have them first in detail, I will offer them for acceptance and publication to the Editor of the *American Veterinary Review* at the same time, and so arrange matters that they are published simultaneously. I am also undecided for the moment as to whether it is wiser to strip both at the one time or to do the left or paralysed side first, see the result, and then if necessary operate on the other some months later. I have about twenty horses now upon which this plan has been adopted, and certainly in some of them the results have been marvellous. They were all hunters and bad roarers, and the stripping of

the left side alleviated the distress, although they still made considerable noise, whilst the second operation some months later has caused still further amelioration, and in some cases I have reason to hope that the animals will pass veterinary examination for soundness in wind. It is a plan I have adopted recently in several instances where the horses were of great monetary value and the time was of no particular object provided the risk was lessened.

Everybody, owner and groom alike, dislikes the idea of the permanent use of the tracheotomy tube, partly because of the constant trouble of cleansing, and partly on account of the granulations and subsequent stenosis which so often follow as a sequel; and a number of owners have volunteered the statement that if this operation only eases the horse so that it can work without distress, even if still making a noise, they will have it done. Others have gone so far as to say that even if it only gives them one more hunting season and the tube has to be inserted eventually they will be grateful. The operation, however, promises more than this, and I do not think I am exaggerating one bit when I say that it will restore to usefulness quite 90 per cent. of carriage or draught horses and 75 per cent. of hunters, and that a decent proportion of these shall, in addition, pass the average veterinary examination for soundness in wind. I believe, too, that the effect is generally lasting and permanent, as there are now a number under observation in England which have been done over eighteen months and some very nearly two years, whose owners assert that they are still satisfactory in regard to wind.

I agree in the main with what Professor Williams has written in the paper he is presenting to you and of which I have seen a copy, and particularly in regard to the care which must be taken to operate delicately and accurately. I have usually completed the stripping of the mucous membrane after using the special scalpel for the primary incision with the middle finger, but this is probably only a question of habit, and so long as this is wholly stripped without the cartilage becoming injured, the operator may be allowed to decide the point for himself. I firmly support him when he states that it is one of these operations in which it is important to do "just enough and not too much," and especially is it of the utmost import-

ance to get the mucous membrane from the bottom of the sac. It has been of particular interest to note the complete or incomplete adhesion of the ventricle in the cases in which I opened the larynx the second time. Certainly there were some in which the result appeared to be all that I could have desired with the left sac, and yet the horse made considerable noise until the right ventricle had been treated in the same way, but in others there had not been complete closure up to the top, and at this end there was orifice enough to insert the end of the middle or forefinger. In regard to early interference I have hesitated to advise owners to have an animal done which was only a *slight* whistler, but several have had them done on their own initiative and I must say that the results have certainly been excellent, and the several horses have been reported afterwards, where tested, to be "sound in wind." I have at the end of this hunting season done a fair number which were only reported as whistlers, but my statistics on this point cannot be complete until more time has elapsed.

I say this advisedly, because I consider that if chondritis proves at all a sequel to be dreaded even by the most careful operation, then I maintain that it will be better to advise an owner with a whistler which is not distressed and does not cause him great annoyance, to work that horse another season or until he is really a roarer. If, on the other hand, a large proportion of these "whistlers" become "sound" horses in so far as their wind is concerned and the result is permanent, I should certainly advise in the future that the operation is done in the early stages of the disease.

I mention the fear of chondritis afterwards because I see that Dr. Williams has alluded to it as a very serious factor in the earlier attempts he made, and I know, too, that it was the great bugbear to Müller, Cadiot, Fleming, Fred Smith, Axe, Raymond, and others who performed arytænoidectomy, but until the end of May of this year (over eighteen months since the first operation was demonstrated in England) I had never met with a single case or one even suspicious of it. In the month of May last I saw three cases and one other was reported to me, in all of which the larynx has become distinctly enlarged and very hard—in fact, ossified—as a sequel to the operation. In three of them I verified the fact by cutting down

on to the larynx and exposing it. None of the horses have yet died, so that I have no larynx to show you. I decided not to open it nor to look inside as I was afraid I might not get my wound to heal again, and two of the horses were useful enough and could gallop without distress although making considerable noise. Two of these had had the left ventricle alone stripped and the other two had been through the bilateral operation. Two had begun to develop symptoms of dyspnœa when galloped, and before being hunted again would certainly have to be "tubed."

I mentioned above that I did not re-open the ossified larynx as I feared it might not heal readily, and my reason for this was that I had heard that sometimes a troublesome sinus formed and that this was very difficult to close; in fact, one such instance had occurred amongst my own cases.

I have thought from observations made that to assist in avoiding both the above complications the patients should not afterwards be turned out to grass, but be manger fed, partly because of the dependent position of the head during grazing, and partly because of the continuous movement of the muscles of the larynx and throat for so long a period of the day as is necessitated by a horse turned out to pasture. Until the part of the injured larynx has completely cicatrized I think it to be very essential that this organ and its surrounding muscles and the other structures should be allowed as much rest as possible.

Untoward Sequelæ.

Of the bad sequelæ likely to follow as the result of the operation, in addition to the fear of chondritis and a troublesome sinus as mentioned above, my own experience has brought me in contact with deaths from asphyxia and from septicæmia, and of each I have had two instances. Until case 206 I never had the slightest anxiety or trouble, but this one broke the record by dying of septicæmia. I thought that we should get a better and quicker adhesion of the right vocal cord (which moved freely) by performing tracheotomy at the same time. My knowledge of physiology was defective, or I should have known that the mere fact of the respiratory air passing in and out of a tube in the trachea made no difference whatever in the move-

ment of the vocal cords. A septic infection took place, a condition which, of course, might have occurred as a sequel to any operation, and the patient died on the fifth day afterwards. The second septicæmia case also died on the fifth day.

The deaths from asphyxia are worth recording, because they will form a warning to other operators to carefully watch their cases during the forty-eight hours subsequent to operation. Both were horses which had previously worn tracheotomy tubes for some time, and in one there was extensive stenosis of the trachea. I ought to have left the tubes in until after they had become convalescent from the laryngeal wound, but in the one case I allowed it to heal up before operating, and in the other case I purposely closed it up at the same time that the ventricular mucous membrane was stripped. In each case a very sudden spasm of the larynx appeared to take place, and death occurred in a few minutes from asphyxia before tracheotomy could be performed, or even a laryngeal tube inserted.

Since introducing the double stripping operation as a routine measure, tracheotomy has had to be performed several times, owing to threatened asphyxia, and the tube left *in situ* for an average period of three to four days; but this is a comparatively minor matter in a hunter, although annoying in a show animal, and the use of a laryngeal tube in the latter may be better. Professor Williams has, I believe, one of his own pattern, and I have had one made with flattened sides, so that the vocal cords do not become impinged upon more than is necessary for fear of ulceration or abrasion. All these occurred after double stripping and usually within twenty-four hours, but we always keep the patient under close observation for forty-eight hours, and in two instances no disturbance of respiration occurred until the third day afterwards, although these were not alarming enough to necessitate tracheotomy. The earliest time at which symptoms of dyspnœa occurred was three hours afterwards, but the majority showed signs of trouble between the fifth and twelfth hours. This dyspnœa may be due to œdema and swelling of the vocal cords or to a sudden spasm or paralysis of these organs, and generally one has at least a couple of hours' warning in the shape of disturbed and noisy breathing which gradually becomes worse. Tracheotomy gives instant relief, and the horse in half-an-hour is usually feeding calmly as if nothing had happened.

Legal Aspect.

It would be impossible, in a short paper like this, to take note of every side of the question, but I have often been asked whether a horse which is shown to have been successfully operated upon should be passed as "sound in wind." That they have been, and that many more will be, I am quite convinced, for I will defy even a veterinary surgeon to detect the scar in fully 80 per cent. of the patients six months after the operation, and until three months ago I would certainly have advised a client that a hunter which had been operated upon a period of six months previously for roaring, and was now noiseless, would be worth more than a horse which had not been done and might go wrong in wind any time. Since, however, seeing the four cases of chondritis and ossification of the larynx which I alluded to above, I think it is only fair that we should know more about the percentages of this sequel before giving too decided an opinion. Time and careful observation alone can settle this point, as also whether one is justified in operating upon a stallion or a brood mare. For my own part, although I fully admit the hereditary aspect of the question, I also know full well that strangles plays an equally large share in the production of roarers, and where this disease has been the cause I do not think that one need hesitate on conscientious grounds to operate. Eliminate these two factors, heredity and strangles, and one would almost banish roarers off the face of the earth.

In reference to the detection of the fact as to whether an animal has been operated upon or not, as I stated a few lines above, it is often quite impossible to detect any scar, and even if one is present it is often almost indistinguishable from the "curl" in the hair which is often present in that situation. The only sure method I know of is to make some effort to cause the horse to attempt to neigh. With a mare having a foal at foot, to remove it and allow her to attempt to approach it, acts very satisfactorily, or, if possible, starve the suspect for some hours and rattle a stable bucket within ear-shot; the resulting effort to neigh gives a totally different sound to that of a healthy horse, for the horse will either be dumb or neigh with a peculiar muffled effort.

I am often asked whether a horse which has been successfully

operated upon can be entered into a sale, or sold privately, as a "good hunter." The usual definition of a "good hunter," as understood in England, is that written at the head of Tattersall's catalogue, in which it states that a horse described as a "good hunter" must be "sound in wind and eyes."

Is a *ci-devant* roarer legally "sound in wind"?

Some day or other the lawyers will have to decide the point, and until then I think we cannot offer an opinion that will stand.

No operation cures every case upon which it is tried, and the operation for roaring is no exception to the rule. But the results which have followed the technique advised by our colleague, Dr. Williams, have been so encouraging that we cannot help but feel that we are at last upon the right track, and that owners and veterinarians alike, not to mention the equine world itself, owe him a debt of gratitude for his dogged perseverance in the face of much discouragement and many difficulties. Let us all do our best to help him to work the matter to a finality, and to carry it out to an absolute and, as far as possible, a universal and uniform success.

CORRECTIONS.

We have received the following note from Mr. L. E. W. Bevan, relating to his article in the July issue of the Veterinary Journal:—

"In the article on the transmission of horse-sickness through the dog, there are one or two mistakes which should be corrected:—

Page 404, line 6 from top, *for* (from hound "Gwelo") *read* (from hound, Gwelo,)

Page 406, temperature reading of horse "Saba," *for*

Date.	Number of Days.	Temperature. Morning.	Evening.	
March 27, 1911	6	100·6 °F.	108·4 °F.	
,, 28, ,,	7	102·2 ,,	108·8 ,,	*read*
March 27, 1911	6	100·6 °F.	102·4 °F.	
,, 28, ,,	7	102·2 ,,	102·8 ,,	

Clinical Articles.

TEN CASES OF ROARING, TREATED BY EXCISION OF THE LARYNGEAL VENTRICLE.

By J. J. O'CONNOR, M.R.C.V.S.

Professor in the Royal Veterinary College of Ireland, Dublin.

No. 1.—Aged chestnut gelding, a splendid hunter, a loud roarer. Had a tube in his trachea and it was in consequence of this tube "becoming troublesome" that the owner had him operated upon for roaring. The tube was removed at the time of operation. On opening the larynx the left arytænoid was seen to be completely paralyzed. The left ventricle only was stripped.

Result.—Stenosis of the trachea occurred when tracheotomy had been performed causing dyspnœa, and the owner had the horse destroyed.

No 2.—Aged brown gelding, a good hunter, a distinct roarer. Left arytænoid completely paralysed. Left ventricle only stripped.

Result.—A complete success. Only a faint noise can be heard when quite close to the animal during a gallop, whereas prior to the operation the roaring could be heard at a long distance.

No. 3.—A five-year-old hunter, making a noise. Left arytænoid paralyzed. Left ventricle stripped.

Result.—Operation successful. Hunts and stays well, only making a slight noise when starting to gallop.

No. 4.—A four-year-old brown thoroughbred stallion making a noise. Both arytænoids moved equally, but it was thought more slowly than normal. Both ventricles were stripped.

Result.—Not improved two months after the operation, when he was sold and lost sight of.

No. 5.—Bay gelding, making a noise, left arytænoid moving feebly. Stripped the left ventricle.

Result.—The horse, I was informed, became incurably lame, was not tried, and was got rid of.

No. 6.—Bay mare, a trooper, making a noise. Operated on both ventricles by the trephine method. By this method both thyro-arytænoid muscles were exposed, and were not atrophied.

* As reported to the Veterinary Medical Association, Ireland, May 26, 1911.

Result.—After two months not improved, and grunts now in addition to roaring.

Nos. 7, 8, 9.—Special reports about these, giving the history of the horses before and after the operation, for which I am indebted to Mr. McKenny. Nos. 7 and 8 are the cases operated upon at the meeting of the Veterinary Medical Association of Ireland held on November 29, 1910.

No. 7.—Bay gelding, four years old, 16.3 hands, flat ribbed, long delicate neck, very thin, unthrifty appearance, visible mucous membrane pale yellow, pulse soft and large, respiratory sounds, upper portion of lungs loud, lower portion crepitating.

History.—Got by a "whistler," a large number of whose stock became "whistlers"; out of a sound-winded mare, dam of three other sound-winded horses, but were sired by other horses believed to be sound in wind.

The horse was trained at three years old, and was then sound; afterwards suffered badly from strangles, and ever since was a bad "whistler," and soon became distressed when galloped.

The horse was put out to grass after the operation, and has not yet been removed, but the owner reports that when the horse gallops he can hear him making a hissing noise, but it is not the sharp distinct whistling noise that it made previous to operation.

No. 8.—A bay gelding, six years old, 15.3 hands, good neck and well ribbed. A bad grunter, and made a very distinct whistling noise when galloped, but did not easily become distressed. Bought by a dealer, without any history; auscultation revealed no abnormal sounds. Operation most successful, the whistling noise being completely removed, and the horse remained a good stayer.

No. 9.—A black stallion, eleven years old, got by a sire whose stock are well known to be very good and sound in every way. Up to ten years old this horse remained sound; he then suffered from a severe attack of influenza, accompanied with a large submaxillary abscess. When he had sufficiently recovered to be exercised, it was noticed that on becoming excited he made a snoring noise. He was given iodide of potass., with the view of causing absorption of any thickening of the mucous membrane and abnormal exudation remaining about the throat. At the expiration of three weeks of this treatment he was much

better, the iodide of potass. was discontinued, and liquor arsenicalis was given in half-ounce doses three times a day, mixed with two wineglassfuls of cod-liver oil, and given with scalded oats; he was then put to his ordinary work; he made no noise when going slowly, but when going fast made a peculiar hissing noise in both the inspiration and expiration. At the end of another fortnight drachm doses of powdered nux vomica and sulphate of iron were given in place of the liquor arsenicalis; this was continued for another fortnight, and alternately these were given as before stated. For three months his work was continued; medicinal treatment was discontinued for two months, at the expiration of which similar medicinal treatment as before stated was repeated for another three months, during which time the horse occasionally suffered from slight colds—that is, coughed a little—and had a slight watery discharge from the nose. On each of these occasions the noise was more easily produced than usual, and assumed a character more like whistling—that is, it became shriller, and more marked in the inspiration than in the expiration, but it always remained more like a horse suffering from a cold than a pure "whistler," which I hold is quite a different sound. The noise made by a true "whistler" is, as the name indicates, a whistle, and is only heard in the inspiration, and the sound in the expiration is soft.

At the end of about eight months this horse was in strong work, and the day after an extra hard day it required to extend him for a long distance before the noise could be heard; it did not stop him. He then suffered from a severe cold, and was laid up for three weeks; he was again gradually got into good working condition, but the noise was as bad as after he had suffered from the submaxillary abscess, and it was determined to remove the membranes from the laryngeal ventricles. Previous to the operation the lungs were examined, and found to be sound.

When the horse was cast for the operation, and during the administration of the chloroform, the jugular veins became enormously distended and pulsated; he was chloroformed cautiously, and it took a long time to get him under its influence: eight ounces of chloroform had to be administered.

When the larynx was first opened, we (three veterinarians) agreed that both arytænoid cartilages were acting; however,

after a short time one said he thought the left cartilage was not acting as well as the other, and another stated that he thought there was a slight difference, and the third said he was of the opinion that both were the same. The skin wound was made not quite so long as usual. The horse got up before he had completely recovered from the chloroform, staggered and fell heavily, and the breathing became very distressed; however, he was held down for fully twenty minutes, and when he got up he at once ate a mash of bran, and seemed no worse for his tumble, but his breathing was very loud and distressed; for the next five days he partook of no food, and his breathing became so much worse that it seemed almost imperative to perform tracheotomy. On the sixth day his lungs became affected; he received some fever drenches, and his sides were stimulated with mustard. Three hours afterwards he ate a small mash of bran, and slowly made a good recovery. However, up to the present, five months since the operation, the noise is no better than it was before the operation.

No. 10.—Aged bay hunter gelding, a splendid hunter, a loud roarer. Stays an ordinary hunt well, as on account of his big stride he is seldom fully extended, but when the hunt is very fast he shows distress. Both ventricles operated upon. The left arytænoid completely paralyzed. Not yet tried.

Remarks.—In no case did a horse die as the result of the operation. Some of the cases showed accelerated breathing for a few days after the operation, but No. 9 was the only horse which showed evident distress and decided dyspnœa, lasting for five days after the operation. No. 10 was not affected in the least in his respirations at any time after being operated upon. The conclusion I have come to from the foregoing cases is that when the arytænoid is undoubtedly paralyzed the operation is likely to be successful, but if the cartilage is not paralyzed a successful result need not be expected. It is evident that many horses make a noise from other causes than paralyzis of the arytænoid cartilage, and the noise is called roaring or whistling for the want of a better name. Up to the present I am sure many such cases have been operated upon as roarers or whistlers, and have been numbered as examples of failures of the operation. I feel convinced that the reputation of the operation is being damaged in this way.

No. 6 is a striking example of a horse making a noise without paralyzis of the arytænoids, for both the thyro-arytænoid muscles were dark red and fleshy in this case, showing that they were not atrophied from paralyzis. The loud grunting noise made by the horse when tried about three months after the operation was so extraordinary, resembling somewhat the roar of a lion, that it was thought there was some abnormal thickening in the larynx at the seat of operation. Consequently the larynx was opened in the hope that something might be done to remedy the defect—if present. When the interior of the larynx was examined, the ventricles were found beautifully obliterated, the arytænoids standing well out of the lumen, and the mucous membrane throughout was as smooth as if nothing had been done to the larynx. There was no thickening of the thyroid cartilage, either inside or outside the larynx. The roaring in this case was evidently not of laryngeal origin, as there was nothing in the larynx to account for such a noise.

PUNCTURED WOUND IN A COB.

By G. MAYALL, M.R.C.V.S.,

Bolton.

Bay cob, six years old, brought to the yard on August 4 suffering from a punctured wound on a level with the right elbow joint and extending from the elbow to beneath the skin of the chest, but not passing through it. It was over a foot in depth, and its external orifice measured 3 in. The off fore-leg was dragged along the ground. The wound was syringed out with 1 in 1,000 mercuric potassic iodide solution and plugged with surgical wool soaked in carbolized oil 1 in 10. A dose of physic was given to the cob, and the chest and shoulder, under the skin of which air could be detected, well rubbed with an emollient liniment. The owner, being away all day, gave up the key of the stable to us, and the cob's wound was syringed out daily with mercuric iodide solution from August 4 to 22, and plugged from the 4th to the 14th. He went to work on August 23. Little pus formed and the lameness gradually declined, so that on August 14 he could put the off fore-leg down, bear weight on it, and move forward and backwards fairly well. My only object in recording this case is to call attention to the fact that there was very little

suppuration indeed, the wound kept fresh and healthy although only dressed and syringed once a day. Carbolized oil was one of the antiseptics used; the stable was a small one and the atmosphere was offensive on entering; the wound took eighteen days to heal sufficiently for the animal to go to work.

The cause of the punctured wound was never ascertained. The cob had been left unattended, got away at a slow pace with the cart, and was run into and knocked down at a corner by another vehicle. Nothing on the colliding vehicle could be seen to have caused the injury, although it was examined minutely. Nothing on the owner's cart or harness could be traced to have occasioned the wound.

CARCINOMA OF THE VULVA OF A MARE.

By L. W. WYNN LLOYD, M.R.C.V.S.
Carnarvon.

Carcinoma of Vulva (Wynn Lloyd).

THE subject of the accompanying photograph was an aged Welsh mare, 14 hands.

The growth, which was the size of a man's fist, was ill-defined and caused no apparent inconvenience beyond matting of the hair on the tail and buttocks with blood and discharges.

The tumour was fixed to the lower third of the lips of the vulva and along the floor of the vagina for about 2 in.

The tail and buttocks having been thoroughly washed and the parts cleansed with antiseptic, I injected codrenine at several points into the tumour.

An assistant on either side separated the lips of the vulva and the growth was carefully dissected out. Bleeding vessels were ligatured and a plug of antiseptic wool placed in the hollow in the floor of the vagina. The mare was sent home the following day and treated with antiseptic dressings, and is doing well.

The tumour was sent to Professor Wooldridge, who kindly examined it and declared it to be Carcinoma.

There were no signs of secondary growths, and as we got to the apparent limits of the growth it is hoped there may not be any recurrence.

Canine Clinical Note.

CÆSAREAN SECTION IN THE BITCH.

By G. MAYALL, M.R.C.V.S.,
Bolton.

THE subject was a brindle bull bitch, "Midge," aged 22 months, pregnant with her second litter. I was called by telephone to attend her at a distance of four miles from the surgery. One dead pup had been delivered by the owner's husband at five o'clock in the morning, and at 11 a.m., when I attended and made an examination, I could just touch the tip of the nose of a second pup. I prescribed liquid extract of ergot 15 minims, and told the owner I would call again about 5 p.m. At my second visit I found that the bitch had made little further progress, but could feel up to the stop of the face of the pup, and at the owner's request proceeded to try and effect delivery. I found it impossible to get the fore feet up and to make any progress with the head unless by smashing the cranial bones.

This I did, and found evidence that the pup had been dead some time, as traction on the head caused it to come away in bits. After working for about two hours, and using all necessary instruments (which had been carefully sterilized previous to operating and were taken out of carbolic solution as they were used) and putting the bitch in various postures, I came to the conclusion that delivery could not be effected by the vagina, and advised the performance of Cæsarean section; to this the owner consented.

The subject was brought into the infirmary at 9.30 p.m. on

"Midge" after the Cæsarean Section.

August 17, and the operation commenced at 10 o'clock, the husband of the owner and my man giving a helping hand. The external region was cleansed, clipped, washed with carbolic soap and swabbed with mercuric iodide solution, and the bitch put on the operating table and chloroformed. An incision five inches long was made through the skin and wall of the abdomen and the edges of the wounds swabbed with renaglandin (Oppenheimer). The uterus was explored and only one pup found therein. The organ was then drawn out and incised by a cut just large enough to allow of extraction of the fœtus; this was a

big one minus the head. The uterus near its incised edges was swabbed out with chinosol solution and the edges of the incision painted with renaglandin. Two rows of interrupted catgut sutures were put in the uterus, the second row burying the first, the edges of the wound being inverted, the abdominal muscles were sutured with catgut and the skin with sterilized hempen cord, both lots being of the interrupted variety.

A pad of boricated cotton wool was put over the wound, and a many-tailed bandage with two holes in for the hind legs applied. The operation from start to finish lasted forty minutes, the bitch being under chloroform the whole time and recovered well from its effects. Next day the external wound was powdered with boric acid and clean wool and bandage applied. The same on August 19. On August 20 the bitch had displaced the bandage and got at the stitches, four of them being out, and the heavy pendulous udder was exerting a good bit of traction on the remaining sutures. There was discharge from the external wound and also from the vulva, neither of which smelt badly. Syringed her out with warm hydrogen peroxide 20 vols. (1 in 10 solution), and also again two days later. Replaced the sutures, painted the external wound with iodoform collodion and discarded the bandage. On the three following days sutures which had broken out had to be replaced and the collodion painting renewed, and on one of these days we could plainly see the healed uterus and the intestines internally. On the twelfth day the wall of the abdomen had closed and the skin wound alone gave trouble. This was powdered with boric acid and occasionally touched with block alum. The temperature of the bitch never rose above three-fifths of a degree from normal, and slight diarrhœa only was noticed on the tenth day. On September 9 she was discharged cured.

I attribute the good result, which rather surprised me after the prolonged parturition operations, to keeping the bitch on nothing but barley water (Robinson's patent barley) and milk after the operation, to syringing her out with hydrogen peroxide which some may think was done too soon, but good effects of which when used early have been noted on other occasions, to careful aseptic and antiseptic precautions at the time of operating, and to the good constitution of the patient. The interference with the sutures and the pendulous nature of the bitch's mammæ

and abdomen were against us, but careful attention pulled her through, much to the delight of her owner, with whom she is a great favourite. I enclose herewith "Midge's" photo for reproduction.

Translations.

FOOT-AND-MOUTH DISEASE OF SUCKLINGS.

By DANIEL GERO.

In the last outbreak of foot-and-mouth disease in Hungary in the autumn and still more in the winter of the year 1910, there were many mortality cases in two to three-weeks-old suckling animals which without previous illness died suddenly. The number of losses may be placed at 60 to 70 per cent. The cause of this lamentable state of affairs appeared to be that the complaint had reached its highest point at the time of the births. In the sucklings no characteristic changes (vesicles, &c.) of foot-and-mouth disease were seen, and in these cases the udder was not always affected, so that it may be considered that the toxic material was passed into the milk of the sick mother animals from the blood.

On *post mortem* there was acute catarrh of the stomach and intestine, parenchymatous degeneration, waxy degeneration of the heart muscle; but often the *post mortem* gave negative results. Good measures to check the number of bad results consisted in removal of the youngsters at once and bringing them up on boiled milk.

(Allatorvosi Lapok.)

CONTAGIOUS PNEUMONIA OF GOATS.

By District Veterinary Surgeon MAX POLGAR and Military Veterinary Surgeon HUBERT KRIESCHE.

Some Angora goats being conveyed from their country to Trebinje were attacked with infectious pneumonia. Out of seventeen goats taken three died on the way and four were visibly ill when landing at Gravosa, one of them dying shortly after; the other three were separated and treated. The clinical symptoms of one goal were: Temp. 40.5° C., laboured breathing 45, pulse scarcely perceptible, heart beats 208 a minute, discharge from the nose, mucous membranes pale, bronchial breathing, rattling and whistling sounds, dry painful cough, lameness of the hind legs. Death occurred in three days. On skinning there were whitish sodden infiltrations at the head and over the abdominal region. On opening the cadaver, the lower half of the lungs showed lobular hepatisation, the cut surface was empty

of air, the parts of the lung dry and reddish-grey in colour, the pleuræ strewn with limp fibrous masses. The two other goats showed similar symptoms and were taken to their destination in a wagon.

The disease was similar and probably identical to that described by Hutcheon and Steel in South Africa, and related to that seen by Nicolle and Refik Bey in Anatolia.

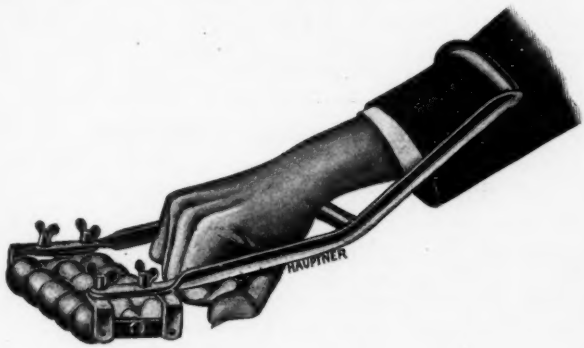
(*Oesterreichische Woch. für Tierheilkunde.*)

AN INSTRUMENT FOR MASSAGE OF THE HORSE AND OX.

By RAEBIGER,

Bielefeld.

Massage is useful for shoulder, croup and loin lamenesses as well as for general treatment of skin and muscle. Hand massage requires too much strength on the part of the operator, and instruments hitherto used have been unsatisfactory. I have constructed an apparatus which visibly lightens the work of the masseur, and can be used without any exercise of great bodily strength on the part of the operator. The apparatus consists of three rows of balls, each revolving in an axis, and the whole



portion of the body acted on by the instrument comes in contact with these balls. A good framework enables them to be grasped by the hand and arm. The balls can be adjusted for deep or shallow massage. Chronic shoulder and loin lamenesses, muscular atrophy, badly-formed muscles of the shoulder, loins, and croup of young animals and breeding cattle have been favourably influenced by roller and ball massage. The firm of Hauptner, of Berlin, are the makers of the instrument.

(*Deutsche Tierärzt. Woch.*)

Miscellaneous.

THE AMERICAN VETERINARY ASSOCIATION.

THE American Veterinary Association held their annual meeting this year at Toronto, and there was an attendance of over 800 veterinary surgeons from all parts of the United States and Canada. About 120 new members were enrolled, and the proceedings were in every way well organized and successfully carried out. Many interesting papers were read and a whole day was given up to practical demonstrations, some twenty operations being performed by specialists in each respective branch. The operations included: in the horse, several cryptorchids, three roarers, tenotomies for the relief of poll evil, and in the dog and cat for various kinds of surgical ailments. Needless to say, the members displayed the keenest interest throughout.

Amongst other toasts given at the banquet, which was presided over by Mr. Rutherford, that of the "Royal College of Veterinary Surgeons," was proposed and honoured. The Association is doing excellent work in America, especially in the way by which it is helping forward the educational status of the veterinary surgeon.

Letters and Communications, &c.

Mr. E. W. Hoare; Mr. L. E. W. Bevan; Mr. L. W. Wynn Lloyd; Mr. G. Mayall; Professor O'Connor; Professor Craig; Dr. Stapley; Professor W. L. Williams; Dr. Hughes; Pasteur Vaccine Co.; Messrs. Arnold and Sons; Messrs. Allen and Hanbury; Spratt's, Ltd.; The British South Africa Co.; Bureau of Animal Industry, U.S.A.; Mr. E. W. Oliver; Mr. A. M. Trotter; Professor Nuttall.

Books and Periodicals, &c., Received.

The Indian Veterinary Journal; Bulletin of the Bureau of Sleeping Sickness; Veterinary Bacteriology, by Dr. R. E. Buchanan (pp. 516, illustrated, 13s. net.), Messrs. Saunders and Co., London; Annual Report of the Punjaub Veterinary College; Annual Report, C.V.D., United Provinces; Annual Report of the Veterinary Surgeons to the City of Glasgow; Memoirs of the I.C.V.D.; Tropical Agriculturist; Annual Report of the Director-General, A.V.S.: Ticks, a monograph of the Ixodoidea, by Nuttall and Warburton (Cambridge University Press).

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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